Appendices A-P

Gopher Snake
Addison Mohler/USFWS

Appendix A. Appropriate Use Determinations

A.1. Introduction

The Appropriate Refuge Uses Policy (603 FW 1 [2006]) outlines the process that the Service uses to determine when general public uses on refuges may be considered. Priority public uses previously defined as wildlife-dependent uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) under the National Wildlife Refuge System Improvement Act of 1997 are generally exempt from appropriate use review. Other exempt uses include situations in which the Service does not have adequate jurisdiction to control the activity, as well as refuge management activities.

In essence, the appropriate use policy provides refuge managers with a consistent procedure to first screen and then document decisions concerning a public use. When a use is determined to be appropriate, refuge managers must then decide if the use is compatible before allowing it on a refuge. The policy also requires review of existing public uses.

During the comprehensive conservation process (CCP) process, the Refuge Manager evaluated all existing and proposed uses at Deer Flat National Wildlife Refuge (NWR) using the following guidelines and criteria as outlined in the appropriate use policy:

- Do we have jurisdiction over the use?
- Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?
- Is the use consistent with applicable executive orders and Department of the Interior (Department) and U.S. Fish and Wildlife Service (Service) policies?
- Is the use consistent with public safety?
- Is the use consistent with goals and objectives in an approved management plan or other document?
- Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?
- Is the use manageable within available budget and staff?
- Will this be manageable in the future within existing resources?
- Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?
- Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D of the appropriate use policy for description of recreational uses) compatible, wildlife-dependent recreation into the future.

The following uses were evaluated and are included in this document.

Refuge Use	Appropriate	Page
Boating at No-wake Speeds at Lake Lowell Unit	Yes	A-3
Competitive Cycling	No	A-7
Competitive Jogging	No	A-11
Competitive Rowing	No	A-15
Cycling and Jogging by Individuals and Groups	Yes	A-19
Farming and Grazing	Yes	A-23

Float Plane (landing and taking off)	No	A-27
Traditional Geocaching (burial or placement of a physical cache)	No	A-31
High-speed Watercraft at Lake Lowell Unit	Yes	A-35
Horseback Riding by Individuals and Groups	Yes	A-39
Ice Skating	No	A-43
Radio-controlled Planes	No	A-45
Research	Yes	A-49
Swimming and Beach Use	Yes	A-53
Walking with Pets (dogs)	Yes	A-57
Sailing Regattas	Yes	A-63
Mosquito Management	Yes	A-67

The Refuge Manager and staff members completed compatibility determinations in Appendix B, for each of the following appropriate uses: boating at no-wake speeds, individuals biking, jogging, and horseback riding; farming and grazing, high-speed watercraft, research, swimming and beach use, picnicking, walking with pets, sailing regattas, and mosquito management.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Boating at No-wake Speeds at Lake Lowell Unit

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?	✓	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Boating at No-wake Speeds at Lake Lowell Unit

(a) Do we have jurisdiction over the use?

Yes. On June 24, 2010, the Department of the Interior Office of the Solicitor concluded that the Service had jurisdiction over surface water uses on Lake Lowell and that Lake Lowell was not in existence at statehood and, therefore, is not classified as navigable water.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes. Boaters using Lake Lowell must comply with all State and Federal boater safety requirements.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. We are currently at the maximum boating visits identified in the 1990 Master Plan, as updated in 1996 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. No compatibility determinations have been previously completed for this use.

(g) Is the use manageable within available budget and staff?

Yes. This use is currently manageable in partnership with the Canyon County Sheriff's Department.

(h) Will this be manageable in the future within existing resources?

Yes, as long as we continue to partner with the Canyon County Sheriff's Department.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

Yes. This mode of transportation allows fishermen, wildlife observers, and other wildlife-dependent recreationists to access to wildlife and environments that could not be reached otherwise. This access increases their enjoyment of the Refuge and appreciation of its wildlife and habitats. Boating at no-wake speeds, in the areas provided by the Preferred Alternative, should cause fewer disturbances to wildlife than high-speed boating. Motorized boats can also cover a larger area in a relatively short time in comparison to nonmotorized boats, affecting more area and providing less time for wildlife to react. Compared to motorboats, human-powered boats like canoes and kayaks appear to cause fewer disturbances to most wildlife species (DeLong 2002; Huffman 1999). Boats traveling at no-wake speeds do cause some level of disturbance to wildlife but the slow speed, low noise levels, and low approach velocity minimizes the adverse effects associated with boat use in no-wake zones while allowing wildlife-dependent recreationists access to wildlife and environments that could not be reached otherwise.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. This use increases access for wildlife-dependent recreationists. As stated above, boats traveling at no-wake speeds do cause some level of disturbance to wildlife but the slow speed, low noise levels, and low approach velocity of boats at no-wake speeds minimize the adverse effects associated with boat use in no-wake zones while allowing wildlife-dependent recreationists access to wildlife and environments that could not be reached otherwise.

Conclusion

Boating at no-wake speeds is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility.

References

DeLong, A.K. 2002. Managing visitor use and disturbance of waterbirds—a literature review of impacts and mitigation measures. Prepared for Stillwater National Wildlife Refuge. Appendix L in: Stillwater National Wildlife Refuge Complex Final Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision (Volume II). Department of the Interior, Fish and Wildlife Service, Region 1, Portland, Oregon. 114 pp. Available at: http://www.fws.gov/pacific/planning/main/docs/NV/stillwater/4%20Volume%20II/Appendix%20L/App%20L%20final%20lit%20review.pdf. Accessed May 18, 2012.

Huffman, K. 1999. San Diego South Bay survey report—effects of human activity and water craft on wintering birds in South San Diego Bay. USFWS.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

Document continues on next page.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Competitive Cycling

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?		✓
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?		✓
(g) Is the use manageable within available budget and staff?		✓
(h) Will this be manageable in the future within existing resources?		✓
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Competitive Cycling

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

No. Refuge paths and roads are not designed for high-speed bicycling. There is a potential for riders to be struck by vehicles on the winding entrance road or to strike pedestrians on narrow and/or winding Refuge trails. Recent requests for competitive group bicycling activities include use of Refuge parking areas for start and finish lines and “watering” stops. Use of potentially busy parking areas for competition bicycling would be dangerous and an impediment to other Refuge visitors’ safe enjoyment and use of Refuge facilities.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

No. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals as defined in the Refuge Management Plan of 1990 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

No. A compatibility determination from 1994 does not allow “organized competitive race events.”

(g) Is the use manageable within available budget and staff?

No. There is no staff available to direct traffic and ensure the safety of riders and the rest of the visiting public.

(h) Will this use be manageable in the future within existing resources?

No. There will be no staff available to direct traffic and ensure the safety of riders and the rest of the visiting public.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. Given that riders are focused on competing or training and riding as quickly as possible, they are not able to take the time to appreciate the Refuge's resources. Noise caused by competition bicycling groups and the speed at which they travel may actually negatively impact Refuge wildlife. According to Knight and Cole (1991), there are three wildlife responses to human disturbance: avoidance, habituation, and attraction. The magnitude of the avoidance response may depend on a number of factors, including the type, distance, movement pattern, speed, and duration of the disturbance; the time of day, time of year, weather; and the animal's access to food and cover, energy demands, and reproductive status (Fernández-Juricic et al. 2007; Gabrielsen and Smith 1995; Knight and Cole 1991). Other factors that affect disturbance impact include the numbers of viewers, the time of day, and noise level.

Rapid movement directly toward wildlife frightens animals, while movement away from or at an oblique angle to animals is less disturbing (Knight and Cole 1995). Human-caused noise, including road noise, has been shown to negatively affect wildlife (Bowles 1995), although the response is often difficult to assess because it may be confounded by responses to visual stimulus. Pease et al. (2005) showed that bicycles (and pedestrians) disturbed more dabbling ducks than other means of transportation. Stalmaster and Newman (1978) suggest that sound may elicit a much milder response from wildlife if animals are visually buffered from the disturbance. Noncompetitive bicycling in a group of more than 10 riders (e.g., a family outing) may be allowed under special conditions provided in a special use permit. Additional requirements to ensure safety and reduce disturbance (such as additional limits to use in time and space) may be established.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No. This use takes up space that could otherwise be utilized by wildlife-dependent recreationists. This use increases the potential for wildlife disturbance through high-speed movement and noise created by a group of competitors, potentially negatively impacting wildlife observers and other wildlife-dependent users.

Conclusion

Because competition bicycling creates a potential public safety issue, negatively impacts wildlife-dependent recreationists and wildlife, and does not allow for the appreciation of the Refuge's natural or cultural resources, this use has been found to be not appropriate at Deer Flat NWR.

References

Bowles, A.E. 1995. Responses of wildlife to noise. Pages 109-156 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Pease, M.L., R.K. Rose, and M.J. Butler. 2005. Effects of human disturbances on the behavior of wintering ducks. Wildlife Society Bulletin 33(1):103-112.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. Journal of Wildlife Management 42:506-513.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Competitive Jogging

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?		✓
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Competitive Jogging

(a) Do we have jurisdiction over the use?

Yes. This use is conducted on the upland portions of Lake Lowell Unit and falls under the jurisdiction of Deer Flat NWR.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

No. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals as defined in the Refuge Management Plan of 1990 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

No. A compatibility determination from 1994 does not allow “organized races and competitions.”

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this use be manageable in the future within existing resources?

Yes.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. Given that joggers are focused on competing or training, they are not able to take the time to appreciate the Refuge's resources. Noise caused by jogging in groups and the speed at which the group is traveling may actually negatively impact Refuge wildlife. According to Knight and Cole (1991), there are three wildlife responses to human disturbance: 1) avoidance; 2) habituation; and 3) attraction. The magnitude of the avoidance response may depend on a number of factors including the type, distance, movement pattern, speed, and duration of the disturbance, as well as the time of day, time of year, weather; and the animal's access to food and cover, energy demands, and reproductive status (Fernández-Juricic et al. 2007; Gabrielsen and Smith 1995; Knight and Cole 1991). Other factors that affect disturbance impact include the numbers of viewers, the time of day, and noise level. Rapid movement directly toward wildlife frightens animals, while movement away from or at an oblique angle to animals is less disturbing (Knight and Cole 1995).

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No. This use takes up space that could otherwise be used by wildlife-dependent recreationists. This use increases the potential for wildlife disturbance through high speed movement and noise, potentially negatively impacting wildlife observers and other wildlife-dependent users.

Conclusion

Since competitive jogging, has been denied by a previous compatibility determination, can negatively impact wildlife-dependent recreationists and wildlife, and does not allow for the appreciation of the Refuge's natural or cultural resources, this use has been found to be not appropriate at Deer Flat NWR.

References

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

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Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Competitive Rowing

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?		✓
(h) Will this be manageable in the future within existing resources?		✓
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Competitive Rowing

(a) Do we have jurisdiction over the use?

Yes. On June 24, 2010, the Department of the Interior Office of the Solicitor concluded that the Service had jurisdiction over surface water uses on Lake Lowell and that Lake Lowell was not in existence at statehood and, therefore, is not classified as navigable water.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

No. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals as defined in the Refuge Management Plan of 1990 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. This is the first time the use has been requested.

(g) Is the use manageable within available budget and staff?

No. There is no staff available to direct traffic and ensure the safety of competitive rowers and the rest of the visiting public.

(h) Will this use be manageable in the future within existing resources?

No.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. Given that competitive rowers are focused on competing or training, they are not able to take the time to appreciate the Refuge's resources.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No. This use takes up space that could otherwise be utilized by wildlife-dependent recreationists. In addition, competitive rowing events would exclude the general public and reduce the quality of wildlife-dependent activities by concentrating many users in the race location. The proposed racing location along the Lower Dam is a popular fishing spot for boat and shoreline anglers.

Conclusion

Because competitive rowing would require additional budget and staff, can negatively impact wildlife-dependent recreationists, and does not allow for the appreciation of the Refuge's natural or cultural resources, this use has been found to be not appropriate at Deer Flat NWR.

References

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

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Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Bicycling and Jogging by Individuals and Groups

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?	✓	✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Bicycling and Jogging by Individuals and Groups

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes. Individual cyclists and joggers should not create public safety concerns. Allowing cycling only on wider multiuse trails (Kingfisher Trail, Gotts Point Trail, East Dike Trail, and the Observation Hill Trail System) should reduce safety conflicts with pedestrian users. Also, multiuse trail etiquette signage would require cyclists to yield to pedestrians and equestrians. Only pedestrian uses would be allowed on more narrow trails and trails used by environmental education groups (Nature Trail, Centennial Trail, and Murphy's Neck Trail).

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. Because this use would be allowed on select multiuse trails giving wildlife and wildlife-dependent users the opportunity to use areas of the Refuge where joggers and bicyclists are absent, the use is not inconsistent with current goals, objectives, and plans

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes.

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this use be manageable in the future within existing resources?

Yes.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

Yes and no. Bicycling and jogging are not defined as wildlife-dependent activities, although individuals could be engaged in wildlife observation while jogging or cycling. The speed and noise created by bicycling and or jogging may in fact negatively impact wildlife. Rapid movement directly toward wildlife frightens animals, while movement away from or at an oblique angle to animals is less disturbing (Knight and Cole 1995). Human-caused noise, including road noise, has been shown to negatively affect wildlife (Bowles 1995), although the response is often difficult to assess because it may be confounded by responses to visual stimulus. Pease et al. (2005) showed that bicycles (and pedestrians) disturbed more dabbling ducks than other means of transportation. Slow-moving cyclists that view wildlife while cycling or wildlife-dependent users that access viewing areas via bicycle may increase their appreciation of the Refuge.

Bicycling or jogging in a group of more than 10 individuals may be allowed under special conditions provided in a special use permit. Additional requirements to ensure safety and reduce disturbance (such as additional limits to use in time and space) may be established.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes and no. This use increases the potential for wildlife disturbance through high-speed movement and noise, potentially negatively impacting wildlife observers and other wildlife-dependent users on multiuse trails. Because this use is only allowed on multiuse trails, wildlife-dependent users would have the opportunity to use walking trails (Nature Trail, Centennial Trail and Murphy's Neck Trail) and the Lower Dam Recreation Area without interacting with joggers and cyclists. Wildlife-dependent visitors are also allowed off-trail in the area around the Observation Hill Trails (North Side Recreation Area) from August 1 through January 31, in the area around the Kingfisher and East Dike Trails (East Side Recreation Area) all year, and in the area around the Gotts Point Trail (Gotts Point) from February 1 through September 30. These off-trail opportunities would allow wildlife-dependent users to view wildlife and habitats in areas where cyclists and joggers are absent.

Bicycling or jogging in a group of more than 10 individuals may be allowed under special conditions provided in a Special Use Permit. Additional requirements to ensure safety and reduce disturbance (such as additional limits to use in time and space) may be established.

Conclusion

Limiting cycling and jogging only to multiuse trails and allowing only individuals and groups with up to 10 riders (a special use permit would be required for groups of more than 10 riders) would limit the disturbance to wildlife and other visitors. Any disturbance created by this use is expected be intermittent and short term in nature. Thus the use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility. This finding of appropriateness only applies to Deer Flat NWR Lake Lowell Unit. It does not provide precedence for appropriateness findings at other refuges or for future appropriateness findings at Deer Flat NWR. Impacts to public safety, wildlife, and wildlife-dependent recreationists by the continuation of cycling and jogging will be studied and alterations and changes to the use will be made if necessary.

References

Bowles, A.E. 1995. Responses of wildlife to noise. Pages 109-156 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Pease, M.L., R.K. Rose, and M.J. Butler. 2005. Effects of human disturbances on the behavior of wintering ducks. Wildlife Society Bulletin 33(1):103-112.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Farming and Grazing

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?	✓	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Farming and Grazing

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. See section (i) below.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes.

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this use be manageable in the future within existing resources?

Yes.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

Yes. Grazing has been shown to be beneficial for single species management such as for foraging geese. Geese use refuge pastures for foraging, preferring young shoots that are higher in protein and lower in fiber than mature stems (McLandress and Raveling 1981). Greenwalt (1978) explained that

some refuges use grazing in improved pasture in an attempt to increase the amount of edible green shoots available for wintering geese. Pasture grasses serve as an important source of amino acids and carbohydrates to meet the energy and nutrient requirements of geese (Baldassarre and Bolen 2006). Grazing by livestock simulates some of the effects of natural disturbances by removing woody vegetation, reducing thatch, and encouraging the production of young shoots, which are preferred forage for Canada and cackling geese (Raveling 1979). Grazing can be used to set back succession, increase native annual forb species and cover, and decrease vegetation height and litter depth (Hayes and Holl 2003), all of which are beneficial to foraging Canada geese.

The farming program provides high carbohydrate forage for wintering and migrating waterfowl. Crop fields planted to small grains such as winter wheat can indirectly benefit some other bird species by provide some foraging habitat for a variety of seed-eating migratory bird species. The Refuge's farmed and grazed lands provide areas of high-energy grain crops and green forage grasses to meet the energy needs of waterfowl and other wildlife and reduce crop depredation in nearby agricultural lands.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. Production of wildlife food and creation of quality goose pasture is likely to draw wildlife to the Refuge and provide a greater opportunity for wildlife-dependent recreation.

The public occasionally encounters farming operations while recreating on Refuge lands. Although some aspects of farming operations—including noise, dust, spraying, sight of grazing animals, and temporary traffic congestion—may be occasional annoyances to members of the public, conflicts and impacts are expected to remain minor over the life of the plan.

Conclusion

Farming and grazing are beneficial to the Refuge's natural resources and help achieve Refuge purposes by controlling invasive and exotic species, improving quality of grassland and wetland habitat, and provide important food resources used by waterfowl and other migratory birds. Therefore, farming and grazing are considered to be appropriate uses subject to stipulations necessary to ensure safety and compatibility.

References

Baldassarre, G.A. and E.G. Bolen. 2006. Waterfowl ecology and management. 2nd edition. Malabar, FL: Krieger Publishing Company.

Greenwalt, L.A. 1978. The National Wildlife Refuge System. Pages 399-412 in: H.P. Brokaw, ed. Wildlife and America. Washington, D.C.: Council on Environmental Quality.

Hayes, G.F. and K.D. Holl. 2003. Cattle grazing impacts on annual forbs and vegetation composition of mesic grasslands in California. Conservation Biology 17(6):1694-1702.

McLandress, M.R. and D.R. Raveling. 1981. Changes in diet and body composition of Canada geese before spring migration. Auk 98:65-79.

Raveling, D.G. 1979. The annual energy cycle of the cackling Canada goose. Pages 81-93 in: R.L. Jarvis and J.C. Bartonek, eds. Management and biology of Pacific Flyway geese. Corvallis, OR: OSU Book Stores.

Document continues on the following page.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Float Plane (landing and taking off)

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?		✓
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?		✓
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Float Plane (landing and taking off)

(a) Do we have jurisdiction over the use?

Yes. On June 24, 2010, the Department of the Interior Office of the Solicitor concluded that the Service had jurisdiction over surface water uses on Lake Lowell and that Lake Lowell was not in existence at statehood and, therefore, is not classified as navigable water.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

No. Under the Code of Federal Regulations (50 C.F.R. 27.34) the "unauthorized operation of aircraft … at altitudes resulting in the harassment of wildlife, or the unauthorized landing or take-off on a national wildlife refuge, except in an emergency is prohibited."

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes.

(d) Is the use consistent with public safety?

No.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

No. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals as defined in the Refuge Management Plan of 1990 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. This is the first time the use has been requested.

(g) Is the use manageable within available budget and staff?

No. There is no staff available to ensure the safety of pilots and the rest of the visiting public.

(h) Will this use be manageable in the future within existing resources?

No.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. The Federal Aviation Administration (FAA) has worked with other Federal agencies including the U.S. Air Force, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Department of Agriculture APHIS Wildlife Services to address aircraft-wildlife strikes in the United States. A Regional Memorandum of Understanding among these parties states that "civil and military aviation communities widely recognize that the threat to human health and safety from aircraft collisions with aircraft-wildlife strikes is increasing." A focus of the cooperation between these Federal agencies is to identify, separate, and mitigate bird air strike hazards by providing separate areas for airplanes and wildlife to exist.

According to the FAA Wildlife Strike Database (FAA 2012), there have been over 120,000 air strikes nationally between 1990 and 2010. Most bird strikes occur during daylight hours between July and October.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No. Landing and take-off of float planes may disturb wildlife-dependent recreationists because of the noise and speed of the aircraft.

Conclusion

Because the use of aircraft is contrary to the purpose, goals, and objectives of the Refuge, would be in violation of the Code of Federal Regulations, is widely recognized as a threat to birds, and would be a safety concern for other Refuge visitors, it would not be considered an appropriate use of the Refuge.

References

FAA (Federal Aviation Administration). 2012. Wildlife strike database. Available at: http://wildlife-mitigation.tc.faa.gov/wildlife/default.aspx.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

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Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Traditional Geocaching (burial or placement of a physical cache)

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?		✓
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Traditional Geocaching (burial or placement of a physical cache)

(a) Do we have jurisdiction over the use?

Yes. This use is conducted on the upland portions of Lake Lowell Unit and falls under the jurisdiction of Deer Flat NWR.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

No. The use is not consistent with the Code of Federal Regulations; 50 C.F.R. Part 27.63 prohibits search for and removal of valued objects and 50 C.F.R. Part 27.93 prohibits abandonment of property on national wildlife refuges.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes.

(d) Is the use consistent with public safety?

Yes.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

No. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals as defined in the Refuge Management Plan of 1990 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. This is the first time the use has been requested.

(g) Is the use manageable within available budget and staff?

No.

(h) Will this use be manageable in the future within existing resources?

No.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

Yes. While geocachers are walking to a designated location, they may take the time to appreciate the Refuge's resources. However, caches can be attractive and potentially dangerous to wildlife. In addition, these treasures are placed in such a way to present a challenge to locate, and exuberant searchers can have a profound effect on soils, vegetation, and local wildlife within the immediate vicinity of the cache.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No. Geocachers may disturb wildlife-dependent recreationists (hunters, anglers, wildlife observers, and photographers) close to an area where a cache has been stashed.

Conclusion

Because geocaching violates the Code of Federal Regulations, this use has been found to be not appropriate at Deer Flat NWR.

References

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

Document continues on next page.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: High-speed Watercraft at Lake Lowell Unit

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: High-speed Watercraft at Lake Lowell Unit

(a) Do we have jurisdiction over the use?

Yes. On June 24, 2010, the Department of the Interior Office of the Solicitor concluded that the Service had jurisdiction over surface water uses on Lake Lowell and that Lake Lowell was not in existence at statehood and, therefore, is not classified as navigable water.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. Although the Refuge Manual (8 RM 9.6) states that "waterskiing will not be allowed on refuge-controlled waters, except where mandated," current policies derived from the 1997 amendments to the National Wildlife Refuge System Administration Act of 1966 provide that uses may be allowed if they are found to be both appropriate and compatible with the purpose for which the Refuge was established.

(d) Is the use consistent with public safety?

Yes. Boaters using Lake Lowell must comply with all State and Federal boater safety requirements. Under the Preferred Alternative, no races or motorized nonwildlife-dependent group activities are allowed, providing a safer boating experience for visitors.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. We are currently at the maximum boating visits identified in the 1990 Refuge Management Plan, as updated in 1996 (USFWS 1996). As structured in the Preferred Alternative, high-speed boating should have a limited impact on the purpose of the Refuge.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. No compatibility determinations have been previously completed for this use.

(g) Is the use manageable within available budget and staff?

Yes. This use is currently manageable in partnership with the Canyon County Sheriff's Department.

(h) Will this be manageable in the future within existing resources?

Yes, as long as we continue to partner with the Canyon County Sheriff's Department.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No and yes. Boating at high speeds does not contribute to the public's understanding and appreciation of the Refuge, and it is not beneficial (and can actually be detrimental) to the Refuge's resources. Motorized boats can also cover a larger area in a relatively short time in comparison to nonmotorized boats, affecting more area and providing less time for wildlife to react. Compared to motorboats, human-powered boats like canoes and kayaks appear to cause fewer disturbances to most wildlife species (DeLong 2002; Huffman 1999). Boating at high speeds is mostly used for recreation purposes (such as tow-behind activities). One disturbance study showed that motorboats were more likely to elicit a response in wintering bald eagles than nearby automatic weapons fire, small arms fire, ordnance impacts, and helicopter flights associated with a military installation (Stalmaster and Kaiser 1997). High-speed boating displaces western and Clark's grebes from preferred habitats, disrupts nesting and feeding, and even causes loss of young (Burger 1997). Grebe adults and chicks are often killed by boats (Ivey 2004; Shaw 1998), and small chicks can become separated from their parents and die of exposure if adults have to dive to avoid motorboats (Storer and Nuechterlein 1992).

Some wildlife-dependent visitors boat at high speeds to reach their ultimate destination. Once at their destination, they may be able to gain a greater appreciation of the Refuge through involvement in wildlife-dependent activities, but it is unlikely that appreciation is gained while boating at high speeds.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No and yes. As described above, given the tendency of birds to flush when subjected to a high intensity of disturbance, wildlife viewing opportunities would be expected to be poor in high-speed watercraft areas between April and September.

Fishing could be both negatively and positively impacted by high-speed watercraft. Using watercraft at high speeds would allow anglers to reach their fishing area more quickly, allowing more time to fish. However, Refuge personnel have received complaints from anglers about noise and wake from high-speed watercraft.

Conclusion

Limiting high-speed watercraft to the center of the lake will limit the disturbance to wildlife (especially nesting wildlife) and other wildlife-dependent visitors. Thus the use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility. This finding of appropriateness only applies to Deer Flat NWR Lake Lowell Unit. It does not provide precedence for high-speed watercraft appropriateness findings at other refuges or for future appropriateness findings at Deer Flat NWR. Impacts to public safety, wildlife, and wildlife-dependent recreationists by the

continuation of high-speed watercraft use will be studied and alterations and changes to the use will be made if necessary.

References

Burger, A.E. 1997. Status of the western grebe in British Columbia. Wildlife Working Report WR-87. B.C. Ministry of Environment, Lands, and Parks. Victoria, British Columbia. 40 pp.

DeLong, A.K. 2002. Managing visitor use and disturbance of waterbirds—a literature review of impacts and mitigation measures. Prepared for Stillwater National Wildlife Refuge. Appendix L in: Stillwater National Wildlife Refuge Complex Final Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision (Volume II). Department of the Interior, Fish and Wildlife Service, Region 1, Portland, Oregon. 114 pp. Available at: http://www.fws.gov/pacific/planning/main/docs/NV/stillwater/4%20Volume%20II/Appendix%20L/App%20L%20final%20lit%20review.pdf. Accessed May 18, 2012.

Huffman, K. 1999. San Diego South Bay survey report—effects of human activity and water craft on wintering birds in South San Diego Bay. USFWS.

Ivey, G.L. 2004. Conservation assessment and management plan for breeding western and Clark's grebes in California. Prepared for the American Trader Trustee Council, an Interagency Group Comprised of Representatives from the California Department of Fish and Game, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service.

Shaw, D.W.H. 1998. Changes in population size and colony location of breeding waterbirds at Eagle Lake, California between 1970 and 1997. Thesis. California State University, Chico.

Stalmaster, M.V. and J.L. Kaiser. Flushing responses of wintering bald eagles to military activity. Journal of Wildlife Management 61(4):1307-1313.

Storer, R.W. and G.L. Nuechterlein. 1992. Western grebe (*Aechmorphorus occidentalis*) and Clark's grebe (*Aechmorphorus clarkia*). In: A. Poole and F. Gill, eds. Birds of North America, No. 26. Philadelphia, PA., Academy of Natural Sciences and American Ornithologists' Union. 24 pp.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Horseback Riding by Individuals and Groups

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?	✓	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Horseback Riding by Individuals and Groups

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes. Individual horseback riders should not create public safety concerns. Equestrian groups with more than 10 horses and riders would be required to obtain an SUP.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. Because this use would be allowed on select multiuse trails giving wildlife and wildlife-dependent users the opportunity to use areas of the Refuge where horses will be absent, the use is not inconsistent with current goals, objectives, and plans

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes.

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this use be manageable in the future within existing resources?

Yes.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

Yes. Rapid movement directly toward wildlife frightens animals, while movement away from or at an oblique angle to animals is less disturbing (Knight and Cole 1995). Slow-moving riders that view wildlife and wildlife-dependent users that use horses to gain access to viewing areas may increase their appreciation of the Refuge, without additional disturbance to wildlife. In fact, observations by Owen (1973) and others suggest that many species of wildlife are habituated to livestock and are less likely to flee when approached by an observer on horseback than by an observer on foot. In one study (Owen 1973), equestrians could approach geese up to a distance of 150 feet without noticeable behavioral changes in the geese. This is compared to a suggested hiking trail distance of 250 feet (Miller et al. 1998). Wildlife impact will depend on the way in which each horse is ridden. Allowing horseback riding only on multiuse trails and not allowing trotting, galloping, or cantering should reduce disturbance to Refuge wildlife and provide sufficient areas for wildlife away from potential disturbance.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. Fast-moving riders may increase the potential for wildlife disturbance, which in turn could reduce the quality of wildlife-dependent recreation occurring in the same vicinity as horseback riding. The frequency of horseback riding on the Refuge is currently very intermittent, and these riders are rarely seen moving at fast speeds for extended periods. If this frequency and type of use is maintained, wildlife-dependent users can expect to encounter horseback riders infrequently on the multiuse trails. Because this use is only allowed on multiuse trails (Observation Hill Trails, Kingfisher Trail, East Dike Trail, and Gotts Point Trail), wildlife-dependent users would have the opportunity to use walking trails (Nature Trail, Centennial Trail, and Murphy's Neck Trail) and the Lower Dam Recreation Area without interacting with horses. Wildlife-dependent visitors are also allowed off-trail in the area around the Observation Hill Trails (North Side Recreation Area) from August 1 through January 31, in the area around the Kingfisher and East Dike Trails (East Side Recreation Area) all year, and in the area around the Gotts Point Trail (Gotts Point) from February 1 through September 30. These off-trail opportunities would allow wildlife-dependent users to view wildlife and habitats in areas where horses are absent.

Not allowing trotting, galloping, or cantering should reduce disturbance to Refuge wildlife and increase the safety of the nonriding public.

Conclusion

Limiting horseback riding only to multiuse trails and slow speeds would limit the disturbance to wildlife and other visitors. Any disturbance created by this use is expected be intermittent and short term in nature. Thus the use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility. This finding of appropriateness only applies to Deer Flat NWR Lake Lowell Unit. It does not provide precedence for horseback riding appropriateness findings at other refuges or for future appropriateness findings at Deer Flat NWR. Impacts to public safety, wildlife, and wildlife-dependent recreationists by the continuation of horseback riding will be studied and alterations and changes to the use will be made if necessary.

References

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8(1):162-169.

Owen, M. 1973. The management of grassland areas for wintering geese. Wildfowl 24:123-130.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Ice Skating

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?		✓
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?		
(g) Is the use manageable within available budget and staff?		
(h) Will this be manageable in the future within existing resources?		
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Ice Skating

(a) Do we have jurisdiction over the use?

Yes. On June 24, 2010, the Department of the Interior Office of the Solicitor concluded that the Service had jurisdiction over surface water uses on Lake Lowell and that Lake Lowell was not in existence at statehood and, therefore, is not classified as navigable water.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

No. Safety is a major concern for recreational users who rely on the structural integrity of the ice on Lake Lowell to enjoy their sport. According to the National Weather Service average monthly high temperatures in Treasure Valley do not reach freezing levels (www.rssweather.com/climate/Idaho/Boise/). This, combined with high winds and long fetch, makes the freezing of the water on Lake Lowell very unpredictable and any frozen areas of the lake potentially unsafe. Systematic ice evaluations by qualified personnel are not conducted on Lake Lowell. Because we proposed to allow ice fishing in the preferred alternative, in Fishing Areas A and B within 200 yards of the dams subject to areas posted by the Bureau of Reclamation, additional safety concerns associated with the possibility of skaters falling into fishing holes were also evaluated.

Conclusion

The National Wildlife Refuge Administration Act, as amended, states that

> the Secretary shall not initiate or permit a new use of a refuge or expand, renew, or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety. The Secretary may make the determinations referred to in this paragraph for a refuge concurrently with development of a conservation plan under subsection (e) of this section. (16 United States Code [U.S.C.] 668dd-3)

Because local weather conditions largely preclude ice skating from being a safe recreation activity and in accordance with the aforementioned law, this use has been found to be not appropriate at Deer Flat NWR.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Radio-controlled Planes

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?		✓
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?		✓
(h) Will this be manageable in the future within existing resources?		✓
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate ✓ Appropriate _____

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Radio-controlled Planes

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

No. According to the Academy of Model Aeronautics (AMA) National Model Aircraft Safety Code, "All pilots shall avoid flying directly over unprotected people, vessels, vehicles or structures and shall avoid endangerment of life and property of others…. At all flying sites a safety line(s) must be established in front of which all flying takes place" (AMA 2011). Therefore, flying planes in general public use areas where other visitors are present would not be safe.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

No. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals as defined in the Refuge Management Plan of 1990 (USFWS 1996).

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. This is the first time the use has been requested.

(g) Is the use manageable within available budget and staff?

No. There is no staff available to establish and monitor appropriate safety lines and other requirements of the AMA National Model Aircraft Safety Code (AMA 2011) to ensure the safety of pilots and the rest of the visiting public.

(h) Will this use be manageable in the future within existing resources?

No.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. Given that radio-controlled aircraft pilots are focused on flying their aircraft, they are not able to take the time to appreciate the Refuge's resources. In addition, operation of radio-controlled aircraft is not beneficial (and can actually be detrimental) to the Refuge's resources. Radio-controlled aircraft are fast-moving and loud, two attributes that are directly associated with wildlife disturbance. For example, rapid movement directly toward wildlife frightens animals, while movement away from or at an oblique angle to animals is less disturbing (Knight and Cole 1995). Human-caused noise, including road noise, has been shown to negatively affect wildlife (Bowles 1995), although the response is often difficult to assess because it may be confounded by responses to visual stimulus.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

No. If proper safety protocols were followed (AMA 2011), this activity would require that a flying area be established with a safety line preventing other public access in the area of flight. Such a designated flight area would take up space that could otherwise be used by wildlife-dependent recreationists. In addition, the speed and noise of radio-controlled aircraft would disturb wildlife and thus reduce the quality of wildlife observation and photography experiences for other Refuge users.

Conclusion

Because the operation of radio-controlled aircraft would not be safe, would require additional budget and staff, can negatively impact wildlife and wildlife-dependent recreationists, and does not allow for the appreciation of the Refuge's natural or cultural resources, this use has been found to be not appropriate at Deer Flat NWR.

References

AMA (Academy of Model Aeronautics). 2011. National model aircraft safety code. Available at: http://www.modelaircraft.org/files/105.pdf. Accessed May 18, 2012.

Bowles, A.E. 1995. Responses of wildlife to noise. Pages 109-156 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

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Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Research

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?	✓	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Research

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes.

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this be manageable in the future within existing resources?

Yes.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

Yes. Scientific findings gained through these projects provide important information regarding life-history needs of species and species groups as well as identify or refine management actions to achieve resource management objectives in refuge management plans (especially CCPs). Reducing

uncertainty regarding wildlife and habitat responses to refuge management actions in order to achieve desired outcomes reflected in resource management objectives is essential for adaptive management in accordance with 522 DM 1.

If a research project's methods impact or conflict with Refuge-specific resources, priority wildlife-dependent public uses, other high-priority research, or Refuge habitat and wildlife management programs, then it must be clearly demonstrated that the project's scientific findings will contribute to resource management and that the project cannot be conducted off of Refuge lands. The investigator(s) must identify in advance the methods/strategies required to minimize or eliminate potential impact(s) and conflict(s). Data collection techniques would generally have minimal animal mortality or disturbance, habitat destruction, no introduction of contaminants, or no introduction of nonindigenous species. In contrast, projects involving the collection of biotic samples (plants or animals) or requiring intensive ground-based data or sample collection would have short-term impacts. To reduce impacts, the minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, and vertebrates) would be collected for identification and/or experimentation and statistical analysis. Where possible, researchers would coordinate and share collections to reduce sampling needed for multiple projects.

Spread of invasive plants and/or pathogens is possible from ground disturbance and/or transportation of project equipment and personnel. Spread of invasive species would be minimized or eliminated by requiring proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary.

There also could be localized and temporary effects from vegetation trampling, collecting of soil and plant samples, or trapping and handling of wildlife. Impacts may also occur from infrastructure necessary to support a project (e.g., permanent transects or plot markers, exclosure devices, monitoring equipment, solar panels to power unattended monitoring equipment). Some level of disturbance is expected with these projects, especially if investigator(s) enter areas closed to the public and collect samples or handle wildlife. However, wildlife disturbance (including altered behavior) would usually be localized and temporary in nature.

Projects would contribute to the enhancement, protection, conservation, and management of native wildlife populations and their habitats on the Refuge. As a result, these projects would help fulfill Refuge purposes; contribute to the mission of the National Wildlife Refuge System (NWRS); and maintain the biological integrity, diversity, and environmental health of the Refuge.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. If a research project's methods impact or conflict with Refuge-specific resources, priority wildlife-dependent public uses, other high-priority research, or Refuge habitat and wildlife management programs, then it must be clearly demonstrated that the project's scientific findings will contribute to resource management and that the project cannot be conducted off of Refuge lands. The investigator(s) must identify methods/strategies in advance required to minimize or eliminate potential impact(s) and conflict(s).

Conclusion

Because of the long-term contributions that research can have to the adaptive management of Refuge resources and the ability to manage resource to reduce conflicts and disturbance, this use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Swimming and Beach Use

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Swimming and Beach Use

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes. Although there have been several drowning-related incidents (mostly near-drownings, but there was one swimming fatality in Fiscal Year 2011) at Lake Lowell in the past few years, the Refuge is hopeful that directing swimmers to two designated swimming areas that are easily accessible to rescue personnel would help to minimize safety issues. There would be no lifeguards stationed at the swimming areas.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. No compatibility determinations have been previously completed for this use.

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this be manageable in the future within existing resources?

Yes.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. Swimming and beach use (including picnicking) do not contribute to the public's understanding and appreciation of Refuge resources. Although this use does not contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or benefit the Refuge's natural or cultural resources, this use should not cause undue harm because swimmers would be directed to two designated swimming areas, which would reduce interaction with high concentrations of wildlife and provide ample quantities of sanctuary where wildlife can find cover. Because picnicking and other uses associated with beach use mostly occur in developed public use areas, they should also have little impact on wildlife.

Although swimming areas often include erratic movement and elevated human noise levels, the designated swimming areas on Lake Lowell are not of great concern for wildlife concentrations. Keeping most shoreline swimming contained to designated areas would reduce the amount of wildlife disturbance associated with the activity.

Allowing visitors to swim and picnic also may provide the opportunity to engage members of the public that may not normally visit refuges where swimming is not allowed.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. Because swimmers would be directed to two designated swimming areas with minimal wildlife use and minimal use by wildlife-dependent recreationists, the use can continue without impairing existing or future wildlife-dependent activities. Picnicking by individuals and small groups should not interfere with other recreationists. Events such as birthday parties and weddings would require Special Use Permits, which would ensure that other recreationists would not be inconvenienced.

Conclusion

Directing swimmers to two designated swimming areas will reduce disturbance to wildlife and wildlife-dependent recreationists and increase safety for swimmers. Because most picnicking takes place in developed public use areas and events would require a Special Use Permit, disturbance to wildlife and other recreationists should be minimal. In addition, allowing swimming and picnicking gives the Refuge the opportunity to engage members of the public that may not normally visit refuges. Thus, the use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility. This finding of appropriateness only applies to Deer Flat NWR Lake Lowell Unit. It does not provide precedence for swimming or beach use appropriateness findings at other refuges or for future appropriateness findings at Deer Flat NWR. Conditions created by the continuation of swimming and beach use (especially the safety of Refuge swimmers) will continue to be watched and alterations or changes to the use will be made if necessary.

Document continues on the following page.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Walking with Pets (dogs)

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Walking with Pets (dogs)

(a) Do we have jurisdiction over the use?

Yes.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. Although there is a Canyon County Ordinance (03-05-021) that states that canines are not allowed in "any public parks within the county … except when such an animal is kept confined in a vehicle or trailer," discussion with Deputy Tweedy of the Canyon County Sheriff's office provided information that local authorities are acting on a contradictory code (04-01-21) that allows pets in public areas as long as they are on a leash that is 6 feet in length or less (Sterling Codifiers Inc. 2011).

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes. The Refuge is not aware of any Executive orders or Department or Service policies that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(d) Is the use consistent with public safety?

Yes. Pets controlled on leashes on multiuse trails and in the Lower Dam Recreation Area are not expected to cause a public safety concern.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. Because this use would be allowed on select multiuse trails giving wildlife and wildlife-dependent users the opportunity to use areas of the Refuge where pets would be absent, the use is not inconsistent with current goals, objectives, and plans.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. No compatibility determinations have been previously completed for this use.

(g) Is the use manageable within available budget and staff?

Yes.

(h) Will this use be manageable in the future within existing resources?

Yes. It is possible that agreements with Canyon County and the State of Idaho could increase the law enforcement presence and the ability of non-Refuge law enforcement personnel to enforce Refuge

regulations. The Refuge currently allows on-leash dogs; however, this requirement is often ignored by visitors. Because the on-leash and on-trail requirements are vital to minimizing wildlife disturbance, the Refuge would monitor the level of compliance that visitors with pets exhibit toward trail use and leash requirements. If compliance monitoring indicates that visitors with dogs routinely disregard leash and trail requirements, the Refuge would evaluate other options for minimizing adverse effects associated with pet/wildlife interactions, including the possibility of prohibiting pets on the Refuge.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. This use does not contribute to the public's appreciation of Refuge resources and may actually be detrimental to Refuge wildlife. Authors of many wildlife disturbance studies conclude that dogs with people, on-leash dogs, or loose dogs provoke a more pronounced disturbance reaction from wildlife than humans alone (Sime 1999). The disturbance effects of human intrusion increased when people were accompanied by dogs in studies of different species including shorebirds (Hoopes 1993; Yalden and Yalden 1989, 1990), passerines (Knight and Miller 1996), and small mammals (Mainini et al. 1993). Another study suggests that harassment of wildlife by domestic dogs is opportunistic and is associated with the concentration of wildlife in a given area (Jones & Stokes 1977). A follow-up study suggests that dog-induced wildlife flushes increase with an increased density of dogs (Abraham 2001). Free-running and feral dogs have been known to kill quail, rabbits, and deer (Bowers 1953; Lowry and McArthur 1978; Nelson and Woolf 1987). Pure-bred dogs trained to hunt can also ferret out ground-nesting birds and small game animals when left to roam free (Bowers 1953).

Domestic dogs can introduce diseases like parvovirus, canine distemper, and plague to wildlife populations. Diseases like giardia infection and rabies can be transmitted to wildlife and to humans. Muscle cysts can be transmitted through dog feces to ungulate species including mule deer (Sime 1999). Dog waste is also known to host endo- and ecto-parasites, and wildlife can contract diseases from contact with dogs or dog wastes (Sime 1999). To reduce this effect on wildlife and people, pet owners would be required to pick up their pet's feces and dispose of it properly, as is also required by county and city ordinances.

Nussear et al. (2008) inadvertently showed that unleashed dogs increase the zone of coverage (or zone of influence) beyond what it would be by solely the handler, thereby increasing the potential to disturb or harm wildlife. When wildlife react by moving away from the disturbance or alter behavior by hiding they will be less likely to be observed. Users of a national wildlife refuge should be able to expect to see wildlife during their visit. Because expectations of seeing wildlife and the amount of wildlife actually seen factor into the quality of experience for wildlife-dependent users (Hammitt et al. 1993), the reduction in observable wildlife that would be caused by allowing nonwildlife-dependent uses could result in avoidance of the Refuge by wildlife-dependent users. To reduce this potential negative effect on wildlife and wildlife-dependent visitors, dogs would still be required to be leashed on the Refuge. Visitors and law enforcement staff have reported dogs fighting in public use areas. These fights can cause damage to the pets as well as visitors who try to separate the dogs. Small children can easily be knocked over or injured by unleashed pets, and unleashed pets have a greater opportunity to bite or harass other visitors. Feeling personally threatened by dogs or other pets may reduce the enjoyment for other visitors. The NWRS Improvement Act (Public Law 105-57) requires that priority consideration be given to wildlife-dependent users, and the presence of pets is not necessary for nonhunting, wildlife-dependent recreational activities.

Although this use does not contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or benefit the Refuge's natural or cultural resources, this use should not cause undue harm as detailed in the Compatibility Determination for Walking with Pets. Pets would only be allowed on a leash no more than 6 feet long, on designated trails and in the Lower Dam Recreation Area, to reduce their interaction with high concentrations of wildlife and people and to provide ample quantities of sanctuary where wildlife can find cover.

Allowing visitors to walk with pets also may provide the opportunity to engage members of the public that may not normally visit refuges where pets are not allowed.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. Although this use increases the potential for wildlife disturbance adjacent to multiuse trails and would impact wildlife-dependent visitors using these trails, this use is being allowed on select multiuse trails (Observation Hill Trails, Kingfisher Trail, East Dike Trail, and Gotts Point Trail), thereby allowing wildlife-dependent users the opportunity to use walking trails (Nature Trail, Centennial Trail, and Murphy's Neck Trail) in the absence of dogs. Wildlife-dependent visitors are also allowed off-trail in the area around the Observation Hill Trails (North Side Recreation Area) from August 1 through January 31, in the area around the Kingfisher and East Dike Trails (East Side Recreation Area) all year, and in the area around the Gotts Point Trail (Gotts Point) from February 1 through September 30. These off-trail opportunities would allow wildlife-dependent users to view wildlife and habitats in areas where pets are absent. Allowing visitors to walk pets under the above noted conditions would not impair existing wildlife-dependent recreation or reduce the potential to provide quality, compatible, wildlife-dependent recreation into the future.

Conclusion

Because pets would only be allowed on a leash that is 6 feet or less, on multiuse trails and in the Lower Dam Recreation Area, the impact to wildlife and wildlife-dependent users would be minimized. In addition, allowing walking with pets also gives the Refuge the opportunity to engage members of the public that may not visit refuges where pets are not allowed. Thus, the use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility. This finding of appropriateness only applies to Deer Flat NWR Lake Lowell Unit. It does not provide precedence for walking with pets appropriateness findings at other refuges or for future appropriateness findings at Deer Flat NWR. Conditions created by the continuation of walking with pets will be studied and alterations and changes to the use will be made if necessary.

References

Abraham, K. 2001. Interactions between dogs and wildlife in parks on the Berkeley Marina. Unpublished report, submitted to Berkeley Parks and Recreation. Available at: http://nature.berkeley.edu/classes/es196/projects/2001final/Abraham.pdf. Accessed May 18, 2012.

Baydack, R.K. 1986. Sharp-tailed grouse response to lek disturbance in the Carberry Sand Hills of Manitoba. Ph.D. dissertation. Colorado State University, Fort Collins. Bowers, R.R. 1953. The free-running dog menace. Virginia Wildlife 14(10):5-7.

Hammitt, W.E, J.N. Dunlin, and G.R. Wells. 1993. Determinants of quality of wildlife viewing in Great Smoky Mountains National Park. Wildlife Society Bulletin 21:21-30.

Hoopes, E.M. 1993. Relationships between human recreation and piping plover foraging ecology and chick survival. Thesis. University of Massachusetts, Amherst.

Jones & Stokes Associates. 1977. Dog depredation on wildlife and livestock in California. California Department of Fish and Game. Jones & Stokes. Sacramento, CA. 64 pp.

Knight, R.L. and S.G. Miller. 1996. Wildlife responses to pedestrians and dogs. Final report submitted to City of Boulder Open Space Department. Department of Fishery and Wildlife Biology, Colorado State University. Fort Collins, CO. 24 pp.

Lowry, D.A. and K.L. McArthur. 1978. Domestic dogs as predators on deer. Wildlife Society Bulletin 6:38-39.

Mainini, B., P. Neuhaus, and P. Ingold. 1993. Behavior of marmots *Marmota marmota* under the influence of different hiking activities. Biological Conservation 64:161-164.

Nelson, T.A. and A. Woolf. 1987. Mortality of white-tailed deer fawns in southern Illinois. Journal of Wildlife Management 51(2):326-329.

Nussear, K.E., T.C. Esque, J.S. Heaton, M.E. Cablk, K.K. Drake, C. Valentin, J.L. Yee, and P.A. Medica. 2008. Are wildlife detector dogs or people better at finding desert tortoises (*Gopherus Agassizii*)? Herpetological Conservation and Biology 3(1):103-115.

Sime, C.A. 1999. Domestic dogs in wildlife habitats. Pages 8.1-8.17 in: G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society.

Sterling Codifiers Inc. 2011. Canyon County Idaho county code. Available at: http://www.sterlingcodifiers.com/codebook/index.php?book_id=820. Accessed February 21, 2012.

Yalden, D.W. and P.E. Yalden. 1989. The sensitivity of breeding golden plovers *Pluvialis apricaria* to human intruders. Bird Study 36:49-55.

Yalden, P.E. and D.W. Yalden. 1990. Recreational disturbance of breeding golden plovers *Pluvialis apricarius*. Biological Conservation 51:243-262.

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Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Sailing Regattas

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ✓ No _____

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Sailing Regattas

(a) Do we have jurisdiction over the use?

Yes. On June 24, 2010, the Department of the Interior Office of the Solicitor concluded that the Service had jurisdiction over surface water uses on Lake Lowell and that Lake Lowell was not in existence at statehood and, therefore, is not classified as navigable water.

(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?

Yes. The Refuge is not aware of any laws or regulations that would preclude this use on the Lake Lowell Unit of Deer Flat NWR.

(c) Is the use consistent with applicable Executive orders and Department and Service policies?

Yes.

(d) Is the use consistent with public safety?

Yes. Due to the size of the vessels and the height of their sails, sailboats are highly visible to other users. This reduces the likelihood of collisions with other Refuge visitors and allows the area within the racing buoys to be open to other users. Safety is also increased by following all International Sailing Federation rules, boating rules set forth by the U.S. Coast Guard and the State of Idaho, and all Refuge rules and regulations. The speed restriction of 20 mph or less will also help to reduce potential safety issues with other sailors or non-regatta users.

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

Yes. We are currently at the maximum boating visits identified in the 1990 Refuge Management Plan, as updated in 1996 (USFWS 1996). As structured in the compatibility determination for sailing regattas, this activity should have a limited impact on the purpose of the Refuge.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

Yes. No compatibility determinations have been previously completed for this use.

(g) Is the use manageable within available budget and staff?

Yes. This use is currently manageable in partnership with the Canyon County Sheriff’s Department.

(h) Will this be manageable in the future within existing resources?

Yes, as long as our budget and staffing remain fairly consistent and we continue to partner with the Canyon County Sheriff's Department. If the Canyon County Sheriff's Department no longer conducted maintenance of boating docks, the resources needed to continue this use would need to be re-evaluated.

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

No. Boating at high speeds does not contribute to the public's understanding and appreciation of the Refuge, and it is not beneficial (and can actually be detrimental) to the Refuge's resources. These sailing vessels cover a larger area in a relatively short time in comparison to human-powered boats, affecting more area and providing less time for wildlife to react. Boating at high speeds is mostly for recreational purposes (such as tow-behind activities). High-speed boating displaces western and Clark's grebes from preferred habitats, disrupts nesting and feeding, and even causes loss of young (Burger 1997). Grebe adults and chicks are often killed by boats (Ivey 2004; Shaw 1998), and small chicks can become separated from their parents and die of exposure if adults have to dive to avoid boats (Storer and Nuechterlein 1992).

Some sailing regatta participants have engaged in wildlife viewing while sailing. It is possible that a participant may be introduced to the beauty of the Refuge and its wildlife through a sailing regatta, simply by being on the Refuge. However, the goal of a sailing regatta is to sail as fast as possible, compete with other sailors, and win a race, not to view wildlife. During the pre-race briefing there is no discussion of wildlife values or the Refuge's purpose. Because of the cursory nature of the participants' interaction with wildlife and the Refuge, it cannot be said that this use contributes to the public's understanding and appreciation of the Refuge's natural resources.

Because of the area in which sailing regattas take place, the speed restrictions assigned to regattas, and the limited number of participants, the regattas should have minimal impacts on wildlife; however, they cannot be said to benefit the Refuge's natural resources.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?

Yes. Given that regattas occur during a time of low visitation, are restricted to 25 vessels, must leave room for other users to dock, and allow other users to enter their course, other users should not be excluded from using the West Pool or the Lower Dam Recreation Area boat launches during sailing regattas.

Because sailing regattas are confined to the center of the West Pool, there is adequate open water habitat available outside of the racing area for wildlife and wildlife-dependent users to use undisturbed. Wildlife-dependent users who use the emergent zones would also be outside of the regatta course.

Wildlife-dependent users would also be able to cross the regatta race course to access other portions of the Refuge, keeping them from being inconvenienced.

Conclusion

Limiting sailing regattas to the center of the lake, restricting the number of participants and speed of vessels, allowing other users to cross the race course, and ensuring adequate dock space for other users would limit the disturbance to wildlife (especially nesting wildlife) and other wildlife-dependent visitors. Thus the use is considered to be an appropriate use subject to stipulations necessary to ensure safety and compatibility. This finding of appropriateness only applies to Deer Flat NWR Lake Lowell Unit. It does not provide precedence for other competitive group event appropriateness findings at other refuges or for future appropriateness findings at Deer Flat NWR. Impacts to public safety, wildlife, and wildlife-dependent recreationists by the continuation of sailing regattas will be studied and alterations and changes to the use will be made if necessary.

References

Burger, A.E. 1997. Status of the western grebe in British Columbia. Wildlife Working Report WR-87. B.C. Ministry of Environment, Lands, and Parks. Victoria, British Columbia. 40 pp.

Ivey, G.L. 2004. Conservation assessment and management plan for breeding western and Clark's grebes in California. Prepared for the American Trader Trustee Council, an Interagency Group Comprised of Representatives from the California Department of Fish and Game, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service.

Shaw, D.W.H. 1998. Changes in population size and colony location of breeding waterbirds at Eagle Lake, California between 1970 and 1997. Thesis. California State University, Chico.

Storer, R.W. and G.L. Nuechterlein. 1992. Western grebe (*Aechmorphorus occidentalis*) and Clark's grebe (*Aechmorphorus clarkia*). In: A. Poole and F. Gill, eds. Birds of North America, No. 26. Philadelphia, PA., Academy of Natural Sciences and American Ornithologists' Union. 24 pp.

USFWS (U.S. Fish and Wildlife Service). 1996 (1990, updated in 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

Finding of Appropriateness of a Refuge Use

Refuge Name: Deer Flat National Wildlife Refuge

Use: Mosquito Management

This form is not required for wildlife-dependent recreational uses; take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	✓	
(b) Does the use comply with applicable laws and regulations (federal, state, tribal, and local)?	✓	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	✓	
(f) Has an earlier documented analysis not denied the use, or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public's understanding and appreciation of the Refuge's natural or cultural resources, or is the use beneficial to the Refuge's natural or cultural resources?		✓
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	✓	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ___ No ✓

When the refuge manager finds the use **appropriate** based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate____ Appropriate ✓

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed. **FWS Form 3-2319 02/06**

Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Mosquito Management

(a) Do we have jurisdiction over the use? Yes

(b) Does the use comply with applicable laws and regulations? Yes

(c) Is the use consistent with applicable Executive orders and Department and Service policies? Yes. Service policy recognizes the importance of maintaining a balanced ecosystem landscape through wildlife population management as noted in 601 FW s 3.14 (B), Biological Integrity, Diversity, and Environmental Health. Controlling mosquito populations is consistent with that policy by reducing wildlife threats from mosquito-borne diseases, such as transmission of West Nile Virus to migratory birds.

(d) Is the use consistent with public safety?
With the spread of mosquito-borne diseases across the country, there is increasing pressure to manage mosquito populations that occur on lands of the National Wildlife Refuge System, especially in wetland areas that are part of the Refuge. The mosquito species documented to be breeding on, or residing on DFNWR, and targeted for monitoring and treatment, are *Culex inornata, Culex pipiens, Culex tarsalis, Culex ervthrothorax, Ochlerotatus nigromaculus, Aedes vexans,* and *Anopheles freebornii*. The presence of Western Equine Encephalitis (WEE) was detected in cattle on ranch property that borders the south boundary of the Refuge in 1999. Active arbovirus surveillance in the adult mosquito population was initiated in 2000. In 2006 there was a West Nile Virus outbreak in Idaho. The Lake Lowell Unit accounted for 40% of the positive West Nile pools detected and tested in Canyon County during the 2006 epidemic. In 2010 and again in 2011 there was no disease activity noted in the mosquito population on DFNWR. While mosquitoes are a natural component of wetlands, we recognize that they can pose a threat to human and wildlife health.

(e) Is the use consistent with goals and objectives in an approved management plan or other document? The use is consistent with the draft comprehensive conservation plan and the Service's Draft Mosquito and Mosquito-Borne Disease Management Policy.

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?
This is the first time these uses have undergone an appropriate use determination, although monitoring has occurred since 1999.

(g) and (h) Is the use manageable within available budget and staff? Use will be conducted by Canyon County Mosquito Abatement District.

(i) Does the uses contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?
Providing information on mosquito-borne diseases is beneficial to the public. Early monitoring and treatment is essentially to avert large-scale outbreaks and the aggressive treatment necessary to control them.

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW1 for description), compatible, wildlife-dependent recreation into the future?
Mosquito control does not substantially impair wildlife-dependent recreational uses on the Refuge because control is seasonal and does not take place on a daily basis. Wildlife-dependent uses in the Refuge may be temporarily displaced, but are not expected to be excluded by mosquito management activities. Mosquito control will benefit wildlife-dependent recreational uses by providing a more pleasant visitor experience.

Document continues on next page.

Appendix B. Compatibility Determinations

B.1 Introduction

The compatibility determinations (CDs) we developed during the comprehensive conservation planning process evaluate uses projected to occur under Alternative 2, the Preferred Alternative in the Deer Flat National Wildlife Refuge Comprehensive Conservation Plan/Environmental Impact Statement (CCP/EIS).

The evaluation of funds needed for management and implementation of each use also assumes implementation as described under Alternative 2. Chapter 6 of the CCP/EIS also contains a cumulative effects analysis of the impacts related to wildlife, habitats, and public uses.

B.1.1. Uses Evaluated at This Time

The following section includes CDs for all refuge uses that are required to be evaluated at this time. According to Service policy, CDs will be completed for all uses proposed under a CCP. Existing wildlife-dependent recreational uses must also be reevaluated and new CDs prepared during development of a CCP or every 15 years, whichever comes first. Uses other than wildlife-dependent recreational uses are not explicitly required to be reevaluated in concert with preparation of a CCP, unless conditions of the use have changed or unless significant new information relative to the use and its effects have become available or the existing CDs are more than 10 years old. However, the Service planning policy recommends preparing CDs for all individual uses, specific use programs, or groups of related uses associated with the proposed action. Accordingly, the following CDs are included in this document for public review.

Refuge Use	Compatible	Next Year Due for Reevaluation	Page
Farming and grazing	Yes	2024	B-5
Fishing	Yes	2029	B-17
Horseback riding, jogging, and bicycling	Yes	2024	B-31
Hunting deer	Yes	2029	B-43
Hunting waterfowl and upland birds	Yes	2029	B-51
Recreational boating	Yes	2024	B-65
Research	Yes	2024	B-77
Sailing regattas	Yes	2024	B-85
Swimming, beach use, and picnicking	Yes	2024	B-97
Walking with pets (other than hunting dogs)	Yes	2024	B-107
Wildlife observation, photography, interpretation, and environmental education	Yes	2029	B-117
Mosquito Management	Yes	2024	B-131

B.1.2 Compatibility—Legal and Historical Context

Compatibility is a tool refuge managers use to ensure that recreational and other uses do not interfere with wildlife conservation, the primary focus of refuges. Compatibility is not new to the National Wildlife Refuge System (NWRS or Refuge System); the concept dates back to 1918. As policy, it has been used since 1962. The Refuge Recreation Act of 1962 directed the Secretary of the Interior to allow only those public uses of refuge lands that were “compatible with the primary purposes for

which the area was established" (16 U.S.C. 460k-460k-4). If a general public use is determined to be appropriate, the use must then undergo a compatibility review. A compatibility review is required for all appropriate public uses, including wildlife-dependent recreational uses.

The term *compatible use* is defined as a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Refuge Manager, would not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge.

The National Wildlife Refuge System Administration Act (Administration Act) defines *sound professional judgment* as a finding, determination, or decision that is consistent with principles of sound fish and wildlife management and administration, available science and resources, and adherence to other applicable laws. Included in this finding, determination, or decision is a refuge manager's field experience and knowledge of the particular refuge's resources.

Part 603 FW 2 of the Fish and Wildlife Service Manual sets forth the policy and guidelines for determining compatibility of proposed uses and provides procedures for documentation and periodic review of existing uses. In addition, the policy requires an opportunity for public review and comment on all CDs. When prepared in conjunction with a CCP, CDs are distributed for public review along with the Draft CCP/EIS.

Under compatibility policy, each use is defined as a recreational, economic/commercial, or management use of a refuge by the public or a non-Refuge System entity. Uses generally providing an economic return (even if conducted for the purposes of habitat management) are also subject to CDs. The Service does not prepare CDs for uses over which the Service does not have jurisdiction. For example, the Service may have limited jurisdiction over refuge areas where property rights are vested by others; where legally binding agreements exist; or where there are treaty rights held by Tribes. In addition, aircraft overflights, emergency actions, some activities on navigable waters, and activities by other Federal agencies on "overlay refuges" are exempt from the compatibility review process.

New compatibility policy, developed in response to the 1997 amendments to the Administration Act, was adopted by the Service in October 2000 (http://refuges.fws.gov/policymakers/nwrpolicies.html). The policy requires that a use must be compatible with both the mission of the System and the purposes of the individual refuge. This standard helps to ensure consistency in application across the Refuge System.

The Service recognizes that CDs are complex. For this reason, refuge managers are required to consider "principles of sound fish and wildlife management" and "best available science" in making these determinations (House of Representatives Report 105-106). Evaluations of the existing uses on Deer Flat National Wildlife Refuge are based on the professional judgment of refuge personnel including observations of refuge uses and reviews of appropriate scientific literature.

The Refuge Manager has the authority to determine, by exercising sound professional judgment, what is a compatible use. In addition to determining if a use would materially interfere with or detract from the fulfillment of the System mission or the purposes of the refuge, the Refuge Manager must also evaluate the direct and indirect impacts of a use on refuge resources. Further, the cumulative impacts of the use when conducted in conjunction with other existing or planned uses of the refuge must also be considered. After evaluating the anticipated impacts of a proposed use and

determining if any stipulations (terms or conditions) are needed to avoid or minimize potential adverse impacts, the Refuge Manager will determine whether or not the use is compatible. This determination is documented in writing and is available for review by the public.

A proposed use can be denied without determining compatibly under certain circumstances, such as instances in which:

1) a proposed use would conflict with other applicable laws or regulations;
2) the use would result in conflicts with the goals or objectives of an approved CCP; or
3) a use is determined to be inconsistent with public safety.

Refuges are closed to all public uses until officially opened. Regulations require that adequate funds be available for administration and protection of refuges before opening them to any public uses. However, wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, environmental education, and interpretation) are to receive enhanced consideration and cannot be rejected simply for lack of funding resources unless the refuge has made a concerted effort to seek out funds from all potential partners. Once found compatible, wildlife-dependent recreational uses are deemed the priority public uses at a refuge. If a proposed use is found not compatible, the use must be modified to be compatible or if the use cannot be modified to be compatible, then the use may not be allowed. Economic uses that are conducted by or authorized by the refuge also require CDs.

B.1.3 References

House of Representatives Report 105-106 (on National Wildlife Refuge System Improvement Act):
http://refuges.fws.gov/policyMakers/mandates/HR1420/part1.html
Compatibility regulations, adopted by the Service in October 2000:
http://refuges.fws.gov/policymakers/nwrpolicies.html.

Document continues on next page.

B.2 Compatibility Determination for Farming and Grazing

RMIS Database Use: Farming and Grazing

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge (NWR or Refuge) was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (Executive Order [E.O.] 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

The discussion below is applicable only to the Lake Lowell Unit of the Refuge and is not applicable to the Snake River Islands Unit.

Farming. Deer Flat NWR currently uses production methods that include cooperative agreement farming, which involves a negotiated agreement between the Refuge and a private farmer (the cooperator) to produce crops for both parties. The cooperator is responsible for all the costs of production except for maintenance of underground irrigation systems and pumps. In return for producing a specified amount of crops for the Refuge, the cooperator is allowed to harvest and sell the remaining crops. In the current cooperative farming program, the cooperative farmers keep 75 percent of the crop and leave the remaining 25 percent for wildlife. All crop selections are agreed to by the Refuge, and special conditions are documented in each cooperative agreement.

Currently, 255 acres are in cooperative farming programs on Deer Flat NWR. The agriculture fields on the Refuge are referred to as Farm Field 1, Farm Field 5, and the Marsh Field, and all of them are on the north side of Lake Lowell. Crops are grown in concert with proper timing for the particular type of crop. The typical growing season varies from 120 to 200 days. Crops grown include cereal grains and green forage for migratory and wintering waterfowl use. Grain crops grown to meet the high energy demands of migratory and wintering waterfowl consist of corn and wheat. Green forage crops, which provide for the fall, winter, and spring Canada goose population, consist of alfalfa and winter wheat.

Farming operations that surround the Refuge participate in “clean farming,” in which fields are tilled in the fall to reduce the amount of invasive weeds and to ready the field for spring planting outside of the wet season. This practice limits the amount of waste grains available in the area to migrating waterfowl. Areas farmed by the cooperator for their share provide additional benefit (not included in the Refuge share) to waterfowl by providing waste grains and/or green forage in harvested fields.

Grazing. The only area where grazing is currently permitted on the Refuge is the Leavitt Tract. The previous land owner historically used the Leavitt Tract to graze his personal cattle. The cooperator is charged a fee based on the number of Animal Unit Months (AUM) that are grazed. An AUM equals the amount of forage required by an animal unit (e.g., one cow or a cow-calf pair) multiplied by the number of months that the animal unit is allowed to graze on the Refuge. The cooperator is allowed to graze 25 and 30 head of cattle from mid-April through September and occasionally 15 to 20 head of horses in the winter. Much of the tract is flooded from a failing irrigation system and backwater from Lake Lowell. Cattle drink from the flooded portion of the field or a runoff ditch also located on the parcel.

Wintering Canada geese benefit from this use because grazing is an effective way to maintain short grasses. Geese prefer young shoots that are higher in protein and lower in fiber than mature stems (McLandress and Raveling 1981). To provide high-quality forage for wintering and migrating geese, the Refuge has managed grazing to ensure that young shoots less than 6 inches tall are available by early October each year and to reduce the accumulation of thatch, which can reduce the number of shoots.

Proposed Use

Farming. Under the Preferred Alternative, cooperative farming would continue under similar conditions. Other than increasing the focus on best management practices, only two major changes are proposed: an additional well on Farm Field 5 and the reimplementation of a shoreline planting program. At one time, approximately 400 acres were farmed on the Refuge, which included planting millet along some of the lake shorelines. Because lakeshore plantings can be less labor intensive and do not require irrigation, they can be a less costly option than expanding cooperative farming in upland areas. However, according to Refuge Narratives, historic attempts at shoreline plantings have been mixed in their success due to the unpredictability of moisture. This strategy was eliminated due to budget constraints at the time. As housing development continues to increase and foraging space is becomes even more limited around the lake, this strategy may be implemented to achieve Refuge goals and objectives.

Special conditions currently in place would continue (see Stipulations section below), including restrictions on pesticide uses, the use of best management practices, limits to the types of crops grown, no grass-crop harvesting from April 15 through June 15 (to reduce the risk of destroying nests of ground-nesting birds), and a requirement to have 6 inches of green browse by October 1.

Grazing. Proposed changes to the grazing program consist of herd rotations as a mechanism to reduce soil compaction and control invasive/undesirable plant species in grazing lands, cleaning and updating irrigation infrastructure (cleaning ditches, redoing corrugations, and replacing irrigation checks) to provide better water control, reestablishing permanent goose pasture by seeding cool season perennial grasses, changing the grazing period to April 1 through August 15, and managing short grasses by activities such as haying, mowing, and burning.

These changes would be highlighted in cooperative land management agreements and grazing plans that would be completed. The Refuge would also conduct a grazing fee market analysis to aid in evaluation of current grazing fees.

Availability of Resources

The following funding for annual costs would be required to administer and manage cooperative agreement farming and grazing, as described above.

Most of the costs associated with carrying out the improvements described in the Preferred Alternative are one-time expenses (see Table B-1). The farming and grazing programs could continue in their current state without additional upgrades. However, these programs would be enhanced greatly by these potential projects. The farming and grazing programs can be managed with current funds. Additional projects to upgrade the programs would require new funding sources. The Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Because there would be a minimal expansion in farmed/grazed acreage, the program would continue to be managed by current staff.

Table B-1. Costs to Implement Improvements to the Farming and Grazing Programs

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
Install new well in Farm Field 5	$80,000-$100,000	
Update irrigation in Leavitt Tract	$12,000	
Interseed grass in Leavitt Tract	$48,000	
Plant crops on shoreline		$70,000
Maintain short grass in Leavitt Tract		$12,000
Total	**$140,000-$160,000**	**$82,000**

Anticipated Impacts of Uses

The discussion below analyzes impacts of the use as proposed under the Preferred Alternative.

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from farming and grazing would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Impacts from Farming

Deer Flat NWR is located within the Columbia Basin, which was once dominated by shrub-steppe habitat. The basin is now dominated by cropland farming, which represents approximately 25 percent of the total upland area on the Refuge.

Direct impacts of cropland management include exposure of soils to wind erosion and impacts from machinery. In general, tillage and cropping that leaves soil bare for portions of the year negatively affect soil quality indicators (Nelson et al. 2006) such as aggregate stability, infiltration rates, and available water capacity. Compaction can result from the use of farming equipment for seeding, causing undesirable increases in bulk density, while tilling may also prevent the accumulation or accelerate the decomposition of organic matter and can diminish earthworm populations (Natural Resources Conservation Service [NRCS] 2012).

Farming may also result in the use and introduction into the environment of chemical agents from pesticide usage and the potential exacerbation of weed issues through ground disturbance and field-to-field movement of cultivating and harvesting equipment. In addition, small mammals, reptiles, and amphibians may be occasionally subject to mortality from farm machinery, and nesting birds may be occasionally disrupted and nests destroyed.

One study claims that globally, due to habitat loss, farming is already the greatest extinction threat to birds (the best known taxon), and its adverse impacts are likely to increase with the growing human

population and demand for food (Green et al. 2005). The same study advocates for wildlife-friendly farming that encourages wildlife use but results in lower yields, similar to the Refuge's cooperative farming program.

Farming activities such as plowing, haying, and cultivating can create a disturbance to migratory birds and other resident wildlife. Timing pasture management activities appropriately provides Canada geese, other migratory birds, and wildlife optimum habitat conditions when they most need it, in the fall through winter seasons.

Impacts from Grazing

The impacts of grazing depend on many factors including timing, habitat type, and stocking rate. Numerous studies, gathered in a review of grazing literature, found that grazing has negative impacts on various grassland birds, nesting waterfowl, and small mammals (Fleischner 1994). These species are not only subject to injury and mortality from trampling during the nesting season, but the conversion of tall pasture grasses to short-cropped grasses results in habitat loss for some species. Fleishcher (1994) also enumerated other negative impacts of grazing such as altering species composition, decreasing density and biomass of individual species, reducing species richness, and changing community organization. Vavra (2005) found similar results also showing that grazing can alter species composition.

Negative impacts from grazing are mostly associated with difficulties in containing the cattle that are attracted to water and can therefore damage sensitive wetland areas if they gain access to those sites. In a review of grazing impacts, Kauffman and Krueger (1984) pointed to studies that showed cattle can cause damage in riparian forest sites and waterways by trampling the understory, compacting soils, degrading water quality, and making areas undesirable for other wildlife. Overgrazing can lead to bank instability, increased runoff, and erosion (Behnke and Raleigh 1978).

Grazing has been shown to be beneficial for single-species management such as for foraging geese. Some refuges use grazing in improved pasture in an attempt to increase the amount of edible green shoots available for wintering geese (Greenwalt 1978). Geese use refuge pastures for foraging, preferring young shoots that are higher in protein and lower in fiber than mature stems (McLandress and Raveling 1981). Pasture grasses serve as an important source of amino acids and carbohydrates to meet the energy and nutrient requirements of geese (Baldassarre and Bolen 2006). Grazing by livestock simulates some of the effects of natural disturbances by removing woody vegetation, reducing thatch, and encouraging the production of young shoots, which are preferred forage for Canada and cackling geese (Raveling 1979). Grazing can be used to set back succession, increase native annual forb species and cover, and decrease vegetation height and litter depth (Hayes and Holl 2003); all of which are beneficial to foraging Canada geese.

Refuge-specific Impacts

The introduction and spread of weeds are expected to be mitigated partly through such practices as equipment cleaning, mowing to prevent seed set and dispersal, and treatments to any source populations that have the potential to infest agricultural fields (usually windborne seed dispersal). Cooperators would be required to follow the same procedures as Refuge equipment operators by cleaning equipment before moving between fields when working in areas of weed infestations to minimize the spread of undesirable plants as per cooperative land use agreements. The Refuge would continue to monitor farming and grazing sites for invasive weeds and would maintain an aggressive

approach to invasive plant control and restoring sites to vegetation with high wildlife value. In addition, the Refuge would continue to work with Canyon County Weed Control to prevent, identify, and eradicate new infestations.

For weed species that are or become established, mechanical, cultural, and biological controls methods would be evaluated. If these methods are not expected to be effective or would have undesirable consequences (such as impacting nests of grassland-nesting birds), then the Refuge may decide to use an herbicide. Chemical usage would be subject to provisions of the Refuge Integrated Pest Management (IPM) Plan (Appendix G). Among other provisions, this plan provides direction that "the most efficacious pesticide available with the least potential to degrade environmental quality (soils, surface water, and groundwater) as well as least potential effect to native species … would be acceptable for use on the refuge." Each approved pesticide would undergo a chemical profile analysis; active ingredients would be analyzed for their risk quotient and this value compared to a level of concern for surrogate species, as established by the Environmental Protection Agency. All applications of herbicides would conform to the specific pesticide label requirements. Employment of this approach would provide for a moderate to minor risk from chemical exposure. However, unquantified risks may still occur via factors not assessed under current protocols, such as species-specific sensitivity that differs from surrogate species sensitivity; exposure through inhalation, exposure through ingestion of pesticide-contaminated soil, and other factors (see Appendix G).

Activities associated with farming practices may have some impact on birds using farm fields. For example, silage activities in the Upper Dam Marsh field may cause geese to move from the immediate area where the farming equipment is operating. However, because these disturbances are short-term and localized, geese, other migratory birds, and wildlife can easily move to an adjacent undisturbed location. Both farming and grazing can have an impact on nesting birds and cause habitat degradation and soil compaction as indicated above. Refuge-specific studies to determine the timing of local birds using farm fields to nest would be conducted in order to reduce impact. Impacts to habitat and soil would also be monitored as noted in stipulations listed below.

Positive effects are also anticipated. In addition to providing high-carbohydrate forage for wintering and migrating waterfowl, per the purpose of the farming program, crop fields planted in small grains such as winter wheat can indirectly benefit a variety of seed-eating migratory bird species by providing some foraging habitat. The Refuge's farmed and grazed lands provide areas of high-energy grain crops and green forage grasses to meet the energy needs of waterfowl and other wildlife and reduce crop depredation in nearby agricultural lands.

Impacts to Priority Public Uses

Currently, the public occasionally encounters farming operations while recreating on Refuge lands. Although some aspects of farming operations—including noise, dust, spraying, sight of grazing animals, and temporary traffic congestion—may be occasional annoyances to members of the public, conflicts and impacts are expected to remain minor over the life of the CCP.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register
- Distributed approximately 1,300 copies of Planning Update #1
- Provided informational presentations to 26 local organizations
- Held evening call-in hours the second and fourth Wednesdays of the month
- Held open houses July 28, August 20, and August 21
- Contacted visitors over eight days in July and August and handed out over 700 flyers
- Over 1,000 comments were received

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list
- Provided informational presentations to 28 local organizations
- Held open houses on June 3, June 4, July 8, and July 9
- Attended local festivals
- Almost 350 comments were received

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
___X___ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

Cooperative land management agreements would contain the following special conditions to ensure compatibility.

Farming Stipulations

- The cooperative farmer is required to perform habitat maintenance work to sustain the field conditions for the benefit of wildlife. Work may include mechanical weed control and fertilization.
- By October 1, alfalfa must be cut to a maximum of 6 inches tall, and winter wheat cut to 3 to 6 inches tall.
- The agreement does not imply or establish a use precedent. Future use of the area would be based on the most satisfactory use of the land for wildlife benefits, cooperator performance, habitat management needs, and administrative needs.

- The cooperative farmer would exercise care to prevent fire and would assume responsibility for fire, which may result from his/her operations.
- No Refuge equipment would be provided for use by the cooperator.
- At the end of the permit period, cooperator is responsible for removing all equipment from Refuge lands.
- The cooperator shall be responsible for repairing damage to Refuge facilities or habitat beyond normal wear and tear resulting from his/her operation.
- Cropland farming would be done under an approved cooperative land management plan and annual cropland management plan per agency policy.
- Pest plants and weeds would be controlled by crop rotations, mechanical treatments, and biological controls where practical; herbicides must be approved by the Refuge Manager on a case-by-case basis.
- Pesticide use must be in compliance with the Service policy requirements for completing an approved pesticide use proposal, and pesticide use must meet other State and Federal requirements.
- The cooperator would provide a record of herbicides used including chemical name, amount used, date, location, and how applied.
- Pesticide applicators must meet all State, Federal, and agency requirements.
- Diligence shall be exercised in the control of County-listed invasive weeds.
- Monitoring of the cropland farming program would be performed by qualified Refuge staff.
- The share of crops left for wildlife would be at least 25 percent.

Grazing Stipulations

- Fencing and ditching would be used to contain cattle and focus grazing on specific pastures during the dry season.
- Season of use shall be from April 1 to August 15 to minimize disturbance to waterfowl and to avoid grazing under wet soil conditions. The Refuge reduces impacts of pasture management by limiting grazing operations and restricting the introduction of cattle during the breeding season in areas where significant impacts to nesting birds would occur.
- The permittee shall remove all cattle, equipment, and materials from the Refuge by the end of the grazing season.
- The selected grazing cooperator must deliver cattle to the Leavitt Tract by way of the Tio Lane entrance.
- Permittees shall be required to leave fields with 2 or more inches of grass and forbs growth at season’s end.
- The agreement does not imply or establish a use precedent. Future use of the area would be based on the most satisfactory use of the land for wildlife benefits, cooperator performance, habitat management needs, and administrative needs.
- Subleasing is prohibited. Animals must be the property of the cooperator.
- At the end of the permit period, the cooperator shall be responsible for removing all livestock from Refuge lands.
- The cooperator shall be responsible for repairing damage to Refuge facilities or habitat beyond normal wear and tear resulting from his/her operation.
- Stocking rates of livestock may be altered should pasture conditions warrant, dependent upon judgment of the Refuge Manager.

- The cooperator would notify the Refuge Manager or designee, at least three days in advance of the date cattle are to be turned in or removed from the Refuge. Any changes in the number of animals shall be immediately reported to the Refuge Manager, or designee. All changes would be documented in writing by the cooperator and provided to the Refuge Manager or designee at the end of the season. Livestock would be contained in assigned units, and fences must be maintained by the cooperator.
- The cooperator is responsible for removing dead livestock carcasses from the Refuge within 24 hours of discovery.
- The cooperator shall comply with the livestock regulations of the State of Idaho relating to health and sanitation requirements.
- Monitoring of the grazing program would be performed by qualified Refuge staff, including surveys to determine if grazing is adversely impacting ground-nesting birds.
- Before using grazing as a tool to rehabilitate cheatgrass-infested uplands, more study would be completed, and experts in this area would be contacted. If grazing is used in upland rehabilitation, a small area would be used as a test area before grazing is allowed in large sage-steppe areas.

Justification

The Refuge farm fields are an important food source for waterfowl and other wildlife when natural foods are limited. With the exception of the smartweed beds, Lake Lowell contains minimal submerged aquatic food for feeding waterfowl. Current crops provide food for wintering waterfowl (primarily geese), quail, pheasant, deer, and mourning doves. Ducks and pheasant use or have historically used Refuge alfalfa fields for nesting. The crops on the Refuge provide a consistent food source for the wintering waterfowl and therefore are important to continue. The conversion from agriculture to low-density development, and changes to local agricultural practices in the area surrounding the Refuge have resulted in food loss for wintering waterfowl. These changes to local agriculture include growing higher-valued specialty crops such as seed alfalfa, onions, and mint; using more efficient harvesting equipment so little waste grain remains in the field; and fall plowing and tilling often by mid-November, which is prior to the peak of waterfowl concentrations. As a result, the availability of winter browse and nutritional foods off-refuge has been substantially reduced. Because this trend is likely to continue in the future, cropland management would be essential for waterfowl management in future years. Although wintering waterfowl numbers have declined over time, numerous waterfowl still winter at Deer Flat NWR.

As a management tool, cooperative land management use is a beneficial Refuge operation in meeting purposes of the Refuge as well as goals and objectives established in the CCP. The farming and grazing activities within the cooperative land management program contribute to achieving Refuge purposes and goals identified in the CCP as well as the National Wildlife Refuge System mission by providing valuable foraging areas for wintering and migrating waterfowl. The combination of management practices and stipulations identified above would ensure that farming and grazing contribute to the enhancement, protection, conservation, and management of native wildlife populations and their habitats on the Refuge. Therefore, farming and grazing are considered to be compatible Refuge uses.

Grazing contributes by economically providing weed control and other habitat maintenance functions that are not feasible for limited Refuge staff to accomplish. A grazed short-grass pasture would

complement the marsh habitat on the Leavitt Tract and provide forage and resting habitat for migrating and wintering geese.

The cooperative land management plan will be written after the CCP is complete and will include a description of the agreement between the Refuge and the private farmer to manage the land for both parties. The grazing management plan will better define the objectives of grazing, the amount of stock grazed, and any time restrictions necessary to meet biological management goals. These management plans will also identify what habitat and/or wildlife will be monitored to determine the benefits and/or impacts of the grazing program. Monitoring would prevent unacceptable or irreversible impacts to fish, wildlife, plants, and their habitats. Thus, allowing farming and grazing to occur with stipulations would not materially detract or interfere with the purposes for which the Refuge was established or the Refuge System mission.

Mandatory reevaluation Date

__2024___ Mandatory 10-year reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

___X____ Environmental Impact Statement and Record of Decision

References

Baldassarre, G.A. and E.G. Bolen. 2006. Waterfowl ecology and management. 2nd edition. Malabar, FL: Krieger Publishing Company.

Behnke, R.J. and R.F. Raleigh. 1978. Grazing and the riparian zone: impact and management perspectives. Pages 184-189 in: Strategies for protection and management of floodplain wetlands and other riparian ecosystems. GTR-WO-12. USDA Forest Service. Washington, D.C. 410 pp.

Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology 8(3):629-644.

Green, R.E., S.J. Cornell, J.P.W. Scharlemann, and A. Balmford. 2005. Farming and the fate of wild nature. Science 307(5709):550-555.

Greenwalt, L.A. 1978. The National Wildlife Refuge System. Pages 399-412 in: H.P. Brokaw, ed. Wildlife and America. Washington, D.C.: Council on Environmental Quality.

Hayes, G.F. and K.D. Holl. 2003. Cattle grazing impacts on annual forbs and vegetation composition of mesic grasslands in California. Conservation Biology 17(6):1694-1702.

Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications … a review. Journal of Range Management 37(5):430-438.

McLandress, M.R. and D.R. Raveling. 1981. Changes in diet and body composition of Canada geese before spring migration. Auk 98:65-79.

Nelson, M.A., S.M. Griffith, and J.J. Steiner. 2006. Tillage effects on nitrogen dynamics and grass seed crop production in western Oregon, USA. Soil Science Society of America Journal 70:825-831.

NRCS (Natural Resources Conservation Service). Soil quality indicator information sheets. Available at: http://soils.usda.gov/sqi/assessment/assessment.html#indicator_sheets. Accessed February 2, 2012.

Raveling, D.G. 1979. The annual energy cycle of the cackling Canada goose. Pages 81-93 in: R.L. Jarvis and J.C. Bartonek, eds. Management and biology of Pacific Flyway geese. Corvallis, OR: OSU Book Stores.

Vavra, M. 2005. Livestock grazing and wildlife: developing compatibilities. Rangeland Ecology and Management 58(2):128-134.

Refuge Compatibility Determination for Farming and Grazing (B.2)

Use is compatible with stipulations.

Prepared by:	_____	_____
	(Signature)	(Date)
Refuge Manager/ Project Leader Approval:	_____	_____
	(Signature)	(Date)

Concurrence:

Refuge Supervisor:	_____	_____
	(Signature)	(Date)
Regional Chief, National Wildlife Refuge System:	_____	_____
	(Signature)	(Date)

B.3 Compatibility Determination for Fishing

RMIS Database Use: Fishing

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655).
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d]).
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended).

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

Fishing is allowed on both the Lake Lowell and the Snake River Islands Units and is the most popular of the priority wildlife-dependent recreational activities. Fishing from above mean high water level on the Snake River Islands is not closely monitored and is thought to be infrequent. Fishing from boats in the Snake River is outside of the jurisdiction of the Service. The Lake Lowell Unit received approximately 46,000 fishing visits in Fiscal Year (FY) 2011.

At the Lake Lowell Unit, the majority of fishing occurs from boats and is allowed from April 15 through September 30. Fishing from open shoreline is allowed any time. During waterfowl hunting season fishing from human-powered boats is allowed in Fishing Areas A and B. When Lake Lowell freezes, ice fishing would be allowed in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by the Bureau of Reclamation. It is the angler's responsibility to confirm and understand the hazards associated with this activity. Fishing from the Snake River Islands Unit is allowed from June 1 through January 31.

At the Lake Lowell Unit, spring and summer fishing are focused on fishing for large and smallmouth bass from boats. The majority of bank fishing is focused on catfish with some anglers fishing for perch, crappie, and bluegill.

There are five boat launches (three of which are improved and maintained) on the Lake Lowell Unit from which fisherman can launch motorized boats. Individuals can also launch human-powered boats from a variety of formal and informal locations along the shore. Current and proposed boating regulations are described in the Recreational Boating Compatibility Determination.

In 2011, four Special Use Permits (SUPs) were issued for fishing tournaments, with tournaments occurring from April 15 through September 30, excluding May 14 through July 9. Fishing tournaments are allowed only every other weekend to provide opportunities for nontournament anglers. Tournaments range in size from small club tournaments of five to 10 boats, to a maximum of 100 boats. Participants in tournaments are required to abide by all no-wake zones, area closures, and State fishing regulations. All bass tournaments must launch from the Lower Dam Recreation Area. The Refuge charges a fee of $100 for each bass tournament.

Proposed Changes to Described Uses

Under the Preferred Alternative, the Refuge would improve and expand facilities and programming to enhance these opportunities as follows.

- Access to Snake River Islands Unit is restricted to June 15 through January 31 on goose-nesting islands and from July 1 through January 31 on heron- and gull-nesting islands. Access to islands would be clearly delineated in Refuge brochure.
- Access to Lake Lowell Unit:
    - To protect nesting birds, access would be allowed only on maintained roads and trails from February 1 through July 31 in the North Side and South Side Recreation Areas. During these months, lakeshore access is restricted to 100 yards on either side of trails accessing the lakeshore. Off-trail travel would be allowed August 1 through January 31.
    - Anglers would be allowed off-trail in the East Side Recreation Area all year.
    - Anglers would be allowed off-trail at Gotts Point February 1 through September 30.

  - Anglers would be allowed access to Murphy's Neck through the walk-through on Orchard Avenue from March 15 to September 30.
  - Gotts Point would be fully open to vehicle access upon completion of a memorandum of understanding with Canyon County to resolve law enforcement issues.
  - Lower Dam Recreation Area would be open from April 15 through September 30.
- The following seasonal closures would be implemented and clearly marked at the Lake Lowell Unit as necessary to protect sensitive wildlife habitat:
  - Up to 300-yard buffer around eagle nests February 15 through July 15.
  - Winter waterfowl closure at Gotts Point October 1 through January 31.
  - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
    - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a global positioning system (GPS) capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
  - Up to 250-yard buffer around heron rookeries from February 1 through July 1
  - Up to 100-yard closure around shorebird feeding areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
- No-wake zones would be implemented as follows to protect sensitive wildlife habitat and provide no-wake recreational opportunities:
  - Protect emergent plant beds on south side of the lake with a 200-yard no-wake zone measured from the edge of the shoreline or emergent vegetation, whichever is closest to the center of the lake.
  - Establish no-wake area in the Narrows between the East and West Pools.
  - Establish no-wake zone east from line between Parking Lot 1 and Gotts Point.
- Provide designated, ADA-accessible fishing access trails, for example:
  - From parking areas at Gotts Point.
  - At Parking Lots 4 and 7.
  - From proposed 0.65-mile ADA-accessible interpretive loop trail in riparian habitat between Lower Dam Recreation Area and Murphy's Neck.
- Provide multipurpose (e.g., fishing, observation), ADA-accessible docks or platforms, for example:
  - At north end of Lower Dam Recreation Area near existing Environmental Education Building.
  - Just west of boat launch at east end of the Upper Dam.
  - Along proposed 2-mile ADA-accessible interpretive elevated boardwalk between Parking Lots 1 and 3.
- Remove walk-through access to Murphy's Neck from Orchard Avenue after installing Murphy's Neck Trail with fishing access from Lower Dam Recreation Area to provide alternate, safer access.

- Provide fishing line receptacles.

Availability of Resources

Deer Flat NWR is open to all of the priority, wildlife-dependent recreational activities, including fishing, and the infrastructure is there for all of these user groups. Even though fishing is the most popular visitor activity, to date only a limited number of facilities have been developed specifically for fishing. Most of the costs associated with carrying out the improvements described in the Preferred Alternative are one-time expenses (see Table B-2). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service will explore all available options to obtain funding to implement these projects, including partnership efforts.

Currently, most on-water law enforcement and boating-related dock maintenance is provided by the Canyon County Sheriff's Office. If the Sheriff's Office ever decided to discontinue this assistance, there would be additional costs associated with maintaining this use. Because the Sheriff's Office is not currently able to provide law enforcement for Refuge-specific regulations, it would be important for the Refuge to increase its law enforcement presence and/or work with Canyon County to enable County deputies to enforce these regulations.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CD for activities using the same resource. For instance, installing new docks would benefit fisherman, but the docks may also be used by visitors engaged in wildlife observation, photography, and interpretation. This same cost has been shown in all CDs that may use the new docks.

Table B-2. Costs to Implement Improvements to the Fishing Program

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Install new docks	$44,600	
*Install seasonal public use regulation signs	$1,400	
*Install public use in hunt area signs	$200	
*Open Gotts Point to vehicles and create accessible trails to water	$62,400	
*New trail at Murphy's Neck	$95,200	
*Print/reprint general Refuge brochures	$3,200	$800
*Seasonal nesting closure signs (Lake Lowell and Snake River Islands Units)	$11,000	
*Install buoys for seasonal closures and permanent no-wake areas	$4,300	
*Buoy and dock maintenance		$7,400
*Replace 25% of regulatory and directional signs		$5,200
*Maintain Murphy's Neck and Gotts Point Trails		$1,000
*Visitor contact station	$480,000	$1,600
*Install and maintain comfort station and vault toilet at Lower Dam Recreation Area (LDRA) and Parking Lot 1	$208,200	$3,000
*Rehabilitate LDRA parking area	$50,000	
*LDRA site plan	$40,000	
*Quality of wildlife-dependent public uses survey	$75,000-$80,000	
*Human/wildlife interaction disturbance studies	$140,000	
*Law enforcement officer		$62,400
Total	**$1,215,500-$1,220,500**	**$81,400**

Anticipated Impacts of the Use

The discussion below analyzes impacts of the use as proposed under Preferred Alternative 2.

General Impacts to Habitat

A number of studies have investigated the impacts of boats on aquatic plants, including reduced biomass, shorter canopies, reduced overall coverage, and increased scours compared to sites with restricted boat use (Asplund and Cook 1997; Wagner 1991; Zieman 1976). While exclusion zones and closures may not prevent habitat degradation, they can have an effect on minimizing damage to this important habitat (Asplund and Cook 1997). Boating can also have effects on shoreline erosion (Johnson 1994; Nanson et al. 1994), resuspension of sediments leading to water clarity issues (Garrad and Hey 1987; Johnson 1994; Yousef et al. 1980), and water pollution (Mastran et al. 1994).

Shoreline fishing has been shown to have environmental consequences in the way of soil compaction, degradation of plant communities, and increased contribution to pollution in the form of litter (O'Toole et al. 2009). Shoreline activities, such as human noise, can cause some birds to flush and go elsewhere. In addition, vegetation trampling and deposition of human waste and litter are expected to commonly occur (Liddle and Scorgie 1980). Disturbance and destruction of riparian vegetation, and impacts to bank stability and water quality, may result from high levels of bank fishing activities.

General Impacts to Wildlife

Recreational angling has the potential to cause disturbance to birds and other wildlife using the open waters and flooded emergent vegetation of the Refuge. Fishing activities may influence the composition of bird communities, as well as distribution, abundance, and productivity of waterbirds (Bell and Austin 1985; Bouffard 1982; Cooke 1987; Edwards and Bell 1985; Tydeman 1977). In one study, an increase in the number of anglers and associated shoreline activity discouraged waterfowl from using otherwise suitable habitat (Jahn and Hunt 1964). Anglers can also influence the numbers, behavior, and diurnal distribution of avian scavengers (Knight et al. 1991).

Boating associated with fishing can alter bird distribution, reduce use of particular habitats or entire areas by waterfowl and other waterbirds, alter feeding behavior and nutritional status, and cause premature departure from areas. Impacts of motorized boating can occur even at low densities, given their noise and speed (Knight and Cole 1995). Both motorized and nonmotorized boating have been shown to change wildlife distribution and use of particular habitats, alter feeding behavior and nutritional status, and cause premature departure from desirable habitat (Bouffard 1982; Kaiser and Fritzell 1984; Korschgen et al. 1985). Studies have also shown that boating disturbance may cause increased flight time and flushing distances in waterfowl species (Havera et al. 1992; Kahl 1991; Kenow et al. 2003; Knapton et al. 2000). Wildlife species that are more sensitive to recreation-related disturbances (e.g., bald eagles, shorebirds, grebes) may find it increasingly difficult to secure adequate food or loafing sites as their preferred habitat becomes fragmented by disturbance (Burger 1997; Pfister et al. 1992; Skagen et al. 1991).

Motorized boats can cover a larger area in a relatively short time in comparison to nonmotorized boats, affecting a greater area and providing less time for wildlife to react. Compared to motorboats, human-powered boats like canoes and kayaks appear to cause fewer disturbances to most wildlife species (Huffman 1999). However, canoes and kayaks can cause measurable disturbance effects

because they can access shallower and more densely vegetated areas of a marsh (Speight 1973). Slow-moving boats in close proximity to nesting great blue herons can cause temporary nest abandonment (Vos et al. 1985), and Huffman (1999) found that nonmotorized boats within 30 meters (98 feet) of the shoreline in south San Diego Bay caused all wintering waterfowl to flush between the craft and shore. There have been several studies documenting impacts to birds native to Deer Flat NWR. One study showed a decrease in use of a bald eagle feeding site when human activity (including motorized boating) occurred within 200 meters (Skagen 1980). Another disturbance study showed that motorboats were more likely to elicit response in wintering bald eagles than nearby automatic weapons fire, small arms fire, ordnance impacts, and helicopter flights associated with a military installation (Stalmaster and Kaiser 1997). Rodgers and Schwikert (2002) measured flushing distances from motorized watercraft for 23 waterbird species, of which the great blue heron was one of the more sensitive, flushing between distances of 8 and 137 meters.

Fishing also results in the direct take of fish. Fishing regulations and harvest are coordinated with the Idaho Department of Fish and Game (IDFG) to avoid excess pressure on populations. The State also conducts the stocking program on Lake Lowell. Fishing would be permitted by angling only unless an SUP is issued. Outreach materials such as fishing brochures, informational panels, and public education on best fishing practices would help educate anglers on fishing regulations and ethical behavior. Working in cooperation with the State of Idaho and requiring the anglers to comply with State regulations would ensure that harvesting of fish does not harm long-term populations and fits well within the public's expectations and local fishing culture.

Local Impacts

Many of the wildlife species that frequent Deer Flat NWR rely on aquatic vegetation. Herons and egrets forage in smartweed beds; grebes make their nests from and in emergent vegetation and ducks raise their broods in the protection that its cover provides. The shallow water and marshy habitat are vital to the survival of wildlife species that call Deer Flat NWR home.

Colonial-nesting birds may be among the most sensitive species subjected to potential disturbance from fishing and fishing-associated boating. Lake Lowell is one of only three lakes in Idaho that routinely sees colonies of nesting western and Clark's grebes whose breeding population is considered imperiled in the state (IDFG 2005). IDFG has printed pamphlets for public distribution that provide information on conflicts between boaters and grebes and the importance of responsible boating. Anglers at Lake Lowell often fish in the shallow, heavily vegetated areas that birds prefer and may negatively impact distribution and abundance of breeding grebes. It is inevitable that there would be some impact to wildlife species from fishing. However, the overall effect of this impact is anticipated to be adequately mitigated by implementing the stipulations listed below.

According to a recent visitor use study done on Lake Lowell (see Appendix L), 38 percent of boaters on the lake were actively engaged in fishing activities during the time of the survey. Between 83 percent and 100 percent of boaters located in the emergent bed or on the edge of the emergent bed were actively involved in fishing. The estimated number of angling visits at the Refuge has increased in recent years (from 33,500 in FY07 to 46,000 in FY11). However, the 2006 National Survey of Fishing, Hunting and Wildlife-associated Recreation showed that between 1996 and 2006, the number of state-resident anglers decreased by 28 percent (USFWS and U.S. Census Bureau 2007). Because both the national and Idaho State trends appear to show a decline in participation in fishing, it is anticipated that future levels of fishing would not materially interfere with the purposes of the Refuge.

In 2011 the estimated number of annual shoreline or dock fishing visits to Deer Flat NWR was 18,300. The impact of these visitors is not monitored, but there is evidence in the way of social trails and litter. Popular shoreline fishing areas have well-worn paths through the vegetation, which fragment and impact habitat in the surrounding area. Careless anglers also leave trash that can have an impact on wildlife. For instance, discarded tangled fishing line can be attractive to a nesting bird that attempts to use it and instead becomes ensnared. By maintaining closed areas, increasing law enforcement, and working with local advocacy groups, these impacts can be reduced. It is anticipated that by implementing the stipulations listed below, this use can coexist with wildlife needs.

Refuge staff would monitor the number of anglers and their effects on wildlife, especially nesting birds. Ongoing monitoring of angling activities on Deer Flat NWR would allow managers to apply adaptive management and address issues as they come up. Monitoring efforts would be a part of an overall fisheries management plan that would help guide fisheries management on the Refuge into the future.

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from fishing would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Impacts to Other Priority Public Uses

Fishing is considered a priority public use under the 1997 Refuge Improvement Act (Public Law 105-57). Conflicts between anglers and hunters are not common as they typically happen in separate seasons. The majority of Lake Lowell is closed to fishing during most of the hunting season. Wildlife photographers and observers may have limited contact with bank anglers, but a majority of fishermen are in boats. Groups involved with environmental education and interpretation are typically located around the Visitor Center and are removed from anglers. Conflicts between fishermen and nonwildlife-dependent recreational boaters are more common.

Under the Preferred Alternative, fishing would continue as it has historically, with a few minor changes. There would be more no-wake zones where anglers would have to slow down sooner to get to popular fishing areas. Sensitive wildlife areas would also be closed off to any entry including anglers. These areas would change annually based on wildlife surveys, which would present a moving target for anglers to keep track of.

Trash associated with fishing activities leaves an unsightly environment that is unpleasant for other Refuge visitors. Placing trash receptacles and restroom facilities in strategic locations, placing fishing docks in high use areas, and creating improved trails to popular spots are planned in the Preferred

Alternative. These improved facilities would mitigate negative impacts associated with concentrated shoreline fishing and allow other areas with limited access to receive reduced angler use and minimal disturbance to wildlife. An appropriate level of cooperative law enforcement would also provide layers of protection for trust resources.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register
- Distributed approximately 1,300 copies of Planning Update #1
- Provided informational presentations to 26 local organizations
- Held evening call-in hours the second and fourth Wednesdays of the month
- Held open houses July 28, August 20, and August 21
- Contacted visitors over eight days in July and August and handed out over 700 flyers
- Over 1,000 comments were received

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list
- Provided informational presentations to 28 local organizations
- Held open houses on June 3, June 4, July 8, and July 9
- Attended local festivals
- Almost 350 comments were received

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____	Use is Not Compatible
___X___	Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- Refuge staff would monitor impacts of these activities annually to assess compliance with these stipulations, impacts to wildlife and wildlife habitat, conflicts between user groups, and user satisfaction. Monitoring data would be used to modify these stipulations if necessary to ensure continued compatibility of these activities.

- All fishing on the Refuge would require the appropriate State license and would occur consistent with applicable Refuge and State regulations designated by IDFG or Oregon Department of Fish and Wildlife (ODFW) as appropriate.
- Access to Snake River Islands Unit is restricted to June 15 through January 31 on goose-nesting islands and from July 1 through January 31 on heron- and gull-nesting islands. Access to islands would be clearly delineated in the Refuge brochure.
- Use would be restricted to official daylight hours only.
- Access to Lake Lowell Unit:
    - To protect nesting birds, access would be allowed only on maintained roads and trails from February 1 through July 31 in the North Side and South Side Recreation Areas. During these months, lakeshore access is restricted to 100 yards on either side of trails accessing the lakeshore. Off-trail travel would be allowed August 1 through January 31.
    - Anglers would be allowed off-trail in the East Side Recreation Area all year.
    - Anglers would be allowed off-trail at Gotts Point from February 1 through September 30.
    - Anglers would be allowed access to Murphy's Neck through the walk-through on Orchard Avenue from March 15 to September 30.
    - Gotts Point would be fully open to vehicle access upon completion of a memorandum of understanding with Canyon County to resolve law enforcement issues
    - Lower Dam Recreation Area would be open from April 15 through September 30.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
        - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
    - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
    - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
    - Wildlife closure at Gotts Point from October 1 through January 31.
    - Wildlife closure at Murphy's Neck from October 1 through March 15.
    - Wildlife closure at Lower Dam Recreation Area from October 1 through April 14.

- No-wake zones would be implemented as follows to protect sensitive wildlife habitat and provide no-wake recreational opportunities:
    - Protect emergent plant beds on south side of the lake with a 200-yard no-wake zone measured from the edge of the shoreline or emergent vegetation, whichever is closest to the center of the lake.
    - Establish no-wake area in the Narrows between the East and West Pools.
    - Establish no-wake zone east from line between Parking Lot 1 and Gotts Point.
- No live, nonnative aquatic bait would be allowed as per Service policy (605 FW 3).
- Fishing line receptacles would be provided.
- Fishing tournaments allowed during boating season (April 15 through October 1) except May 14 through July 9. All no-wake zones, area closures, and State fishing regulations must be followed (except catch-and-release before end of June). Bass tournaments only allowed every other weekend (to provide opportunities for nontournament anglers). All bass tournaments must launch from the Lower Dam Recreation Area. The fee would be $100, and there would be a limit of 100 boats. The 30 boat trailer parking spots closest to the ramp would be marked and made available to non-tournament participants.
- No live, nonnative aquatic bait would be allowed as per Service policy (605 FW 3).
- Open fires would be prohibited.
- Ice fishing would be allowed in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by the Bureau of Reclamation. Anglers would be responsible for checking ice conditions and confirming that they are safe.

Justification

Fishing, when compatible, is considered a priority public use for the National Wildlife Refuge System. Angling brings visitors to the Refuge and often enhances their appreciation of natural resources. Parts of Deer Flat NWR are closed to all public use to provide areas of undisturbed habitat for fish and wildlife. The stipulations listed above would provide protections that reduce disturbances to colonial waterbirds and other wildlife. The combination of closed areas, seasonal use areas, minimally used areas, and seasonal high use areas, allows quality fishing opportunities and high-quality fish and wildlife habitat to coexist on the Refuge.

Fishing is a priority wildlife-dependent use for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife (E.O. 12996, March 25, 1996) and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). The Service's policy is to provide expanded opportunities for wildlife-dependent uses when compatible and consistent with sound fish and wildlife management and to ensure that they receive enhanced attention during planning and management. Although these activities can result in disturbance to wildlife and habitat, disturbances on the Refuge related to fishing are expected to be intermittent and minor and are not expected to diminish the value of the Refuge for its stated purposes. The stipulations stated above would ensure proper control of the use and provide management flexibility should detrimental impacts develop. Facilitating this use on the Refuge would increase visitor knowledge and appreciation of fish and wildlife resources. This enhanced understanding would foster increased public stewardship of natural resources and support for the Service's management actions in achieving the Refuge purposes and the mission of the National Wildlife Refuge System.

It is anticipated that wildlife populations would find sufficient food resources, nesting and breeding areas, and resting places such that their abundance and use of the Refuge would not be measurably

lessened from allowing fishing at Lake Lowell and from islands in the Snake River Unit. The relatively limited number of individuals expected to be adversely affected due to fishing would not cause wildlife populations to materially decline, the physiological condition and production of wildlife species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing fishing would not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the Refuge was established.

Mandatory reevaluation Date

__2029___ Mandatory 15-year reevaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

___X___ Environmental Impact Statement and Record of Decision

References

Asplund, T.R. and C.M. Cook. 1997. Effects of motor boats on submerged aquatic macrophytes. Lake and Reserve Management 13(1):1-12.

Bell, D.V. and L.W. Austin. 1985. The game-fishing season and its effects on overwintering wildfowl. Biological Conservation 33:65-80.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Bouffard, S.H. 1982. Wildlife values versus human recreation: Ruby Lake National Wildlife Refuge. Transactions of the North American Wildlife and Natural Resources Conference 47:553-558.

Burger, A.E. 1997. Status of the western grebe in British Columbia. Wildlife Working Report WR-87. B.C. Ministry of Environment, Lands, and Parks. Victoria, British Columbia. 40 pp.

Cooke, A.S. 1987. Disturbance by anglers of birds at Grafham Water. ITE Symposium 19:15-22.

DeLong, A.K. 2002. Managing visitor use and disturbance of waterbirds—a literature review of impacts and mitigation measures. Prepared for Stillwater National Wildlife Refuge. Appendix L in: Stillwater National Wildlife Refuge Complex Final Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision (Volume II). Department of the Interior, Fish and Wildlife Service, Region 1, Portland, Oregon. 114 pp. Available at: http://www.fws.gov/pacific/planning/main/docs/NV/stillwater/4%20Volume%20II/Appendix%20L/App%20L%20final%20lit%20review.pdf. Accessed May 18, 2012.

Edwards, R.W. and D.V. Bell. 1985. Fishing in troubled waters. New Scientist 1446(7 March):19-21.

Garrad, P.N. and R.D. Hey. 1987. Boat traffic sediment resuspension and turbidity in a broadland river. Journal of Hydrology 95:289-297.

Havera, S.P., L.R. Boens, M.M. Georgi, and R.T. Shealy. 1992. Human disturbance of waterfowl on Keokuk Pool, Mississippi River. Wildlife Society Bulletin 20(3):290-298.

Huffman, K. 1999. San Diego South Bay survey report—effects of human activity and water craft on wintering birds in South San Diego Bay. USFWS.

IDFG (Idaho Department of Fish and Game). 2005. Idaho comprehensive wildlife conservation strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. Available at: http://fishandgame.idaho.gov/public/wildlife/cwcs/. Accessed May 18, 2012.

Jahn, L.R. and R.A. Hunt. 1964. Duck and coot ecology and management in Wisconsin. Wisconsin Conservation Department Technical Bulletin No. 33. 212 pp.

Johnson, S. 1994. Recreational boating impact investigations—Upper Mississippi River System, Pool 4, Red Wing, Minnesota. EMTC 94-S004. Prepared for the National Biological Survey, Environmental Management Technical Center. Minnesota Department of Natural Resources. Lake City, MN. 48 pp. +appendices.

Kahl, R. 1991. Boating disturbance of canvasbacks during migration at Lake Poygan, Wisconsin. Wildlife Society Bulletin 19(3):242-248.

Kaiser, M. and E. Fritzell. 1984. Effects of river recreationists on green-backed heron behavior. Journal of Wildlife Management 48(2):561-567.

Kenow, K.P., C.E. Korschgen, J.M. Nissen, A. Elfessi, and R. Steinbach. 2003. A voluntary program to curtail boat disturbance to waterfowl during migration. Waterbirds 26(1):77-87.

Knapton, R.W., S.A. Petrie, and G. Herring. 2000. Human disturbance of diving ducks on Long Point Bay, Lake Erie. Wildlife Society Bulletin 28(4):923-930.

Knight, R.L. and D.N. Cole. 1995. Wildlife responses to recreationists. Pages 51-69 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L., D.P. Anderson, and N.V. Marr. 1991. Responses of an avian scavenging guild to anglers. Biological Conservation. 56:195-205.

Korschgen, C., L. George, and W. Green. 1985. Disturbance of diving ducks by boaters on a migrational staging area. Wildlife Society Bulletin 13:290-296.

Liddle, M.J. and H.R.A. Scorgie. 1980. The effects of recreation on freshwater plants and animals: a review. Biological Conservation 17:183-206.

Mastran, T.A., A.M. Dietrich, D.L. Gallagher, and T.J. Grizzard. 1994. Distribution of polyaromatic hydrocarbons in the water column and sediments of a drinking water reservoir with respect to boating activity. Water Research 28(11):2353-2366.

Nanson, G.C., A. von Krusenstierna, E.A. Bryant, and M.R. Renilson. 1994. Experimental measurements of river-bank erosion caused by boat-generated waves on the Gordon River, Tasmania. Regulated Rivers: Research and Management 9(1):1-15.

O'Toole, A.C., K.C. Hanson, and S.J. Cooke. 2009. The effect of shoreline recreational angling activities on aquatic and riparian habitat within an urban environment: implications for conservation and management. Environmental Management 44:324-334.

Pfister, C., B.A. Harrington, and M. Lavine. 1992. The impact of human disturbance on shorebirds at a migration staging area. Biological Conservation 60:115-126.

Rodgers, J.A., Jr. and S.T. Schwikert. 2002. Buffer-zone distances to protect foraging and loafing waterbirds from disturbance by personal watercraft and outboard-powered boats. Conservation Biology 16(1):216-224.

Skagen, S.K. 1980. Behavioral responses of wintering bald eagles to human activity on the Skagit River, Washington. Pages 231-241 in: R.L. Knight, G.T. Allen, M.V. Stalmaster, and C.W. Servheen eds. Proceedings of the Washington Bald Eagle Symposium. The Nature Conservancy. Seattle, WA. 254 pp.

Skagen, S.K., R.L. Knight, and G.H. Orians. 1991. Human disturbances of an avian scavenging guild. Ecological Applications 1:215-225.

Speight, M.C.D. 1973. Outdoor recreation and its ecological effects: a bibliography and review. Discussion Papers in Conservation 4. University College London, England. 35 pp.

Stalmaster, M.V. and J.L. Kaiser. 1997. Flushing responses of wintering bald eagles to military activity. Journal of Wildlife Management 61(4):1307-1313.

Tydeman, C.F. 1977. The importance of the close fishing season to breeding bird communities. Journal of Environmental Management 5:289-296.

USFWS and U.S. Census Bureau. 2007. 2006 national survey of fishing, hunting and wildlife-associated recreation. Available at: http://www.census.gov/prod/2008pubs/fhw06-nat.pdf. Accessed May 18, 2012.

Vos, D.K., R.A. Ryder, and W.D. Graul. 1985. Response of breeding great blue herons to human disturbance in northcentral Colorado. Colonial Waterbirds 8:13-22.

Wagner, K.J. 1991. Assessing the impacts of motorized watercraft on lakes: issues and perceptions. Pages 77-93 in: Proceedings of a national conference on enhancing states' lake management programs. May 1990. Northeastern Illinois Planning Commission. Chicago, IL. 148 pp.

Yousef, Y.A., W.M. McLellon, and H.H. Zebuth. 1980. Changes in phosphorus concentrations due to mixing by motorboats in shallow lakes. Water Research 14(7):841-852.

Zieman, J.C. 1976. The ecological effects of physical damage from motor boats on turtle grass beds in southern Florida. Aquatic Botany 2:127-139.

Refuge Compatibility Determination for Fishing (B.3)

Use is compatible with stipulations.

Prepared by:	_____	_____
	(Signature)	(Date)
Refuge Manager/ Project Leader Approval:	_____	_____
	(Signature)	(Date)

Concurrence:

Refuge Supervisor:	_____	_____
	(Signature)	(Date)
Regional Chief, National Wildlife Refuge System:	_____	_____
	(Signature)	(Date)

B.4 Compatibility Determination for Horseback Riding, Jogging, and Bicycling

RMIS Database Uses: Horseback Riding, Jogging, and Bicycling

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future

generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Uses

These uses rarely, if ever, occur on the Snake River Islands Unit. Several trails at Deer Flat NWR's Lake Lowell Unit are used extensively by the public for activities including horseback riding, jogging, and bicycling. Existing trails used for these activities are primarily on the north side of the lake and include the East Dike and Kingfisher Trails in the East Side Recreation Area, the Gotts Point Trail, and the Observation Hill Trail System and the Centennial and Nature Trails in the North Side Recreation Area. While trails on the south side do exist, they are short, go directly from the parking lots to the lake edge, and are typically not used by joggers, cyclists, or horseback riders. Horseback riders do sometimes use the fire breaks in the South Side Recreation Area. Refuge trails are maintained gravel roads and single-track dirt paths, with the exception of the concrete Centennial Trail. Trails are easily accessed from existing parking areas. Spring and summer months have the highest rates of these kinds of usage. Based on Refuge staff counts we estimated the number of walkers/joggers to be 16,500 in 2010, but there are no data for equestrians or cyclists. All three of the uses described in this CD were addressed and deemed compatible in a previous CD.

Proposed Uses

Under Preferred Alternative 2, the Refuge would continue to allow horseback riding, jogging, and bicycling on designated trails with stipulations to maintain public safety, reduce conflicts between wildlife-dependent user groups, and ensure compatibility with the Refuge's purpose and National Wildlife Refuge System mission. Through these uses, the Refuge would reach out to nontraditional Refuge user groups with information about the Refuge and Refuge System. Due to the close proximity of Deer Flat NWR to the cities of Nampa and Caldwell, the number and variety of users to this urban refuge is expected to grow. For many of these people, multiple-use trails may provide an introduction to a national wildlife refuge. More details for the proposed uses follows.

Horseback Riding. Horseback riding would be allowed only on designated trails (the East Dike, Kingfisher, and Gotts Point Trails and the Observation Hill Trail System) to prevent soil erosion and trail widening that commonly occurs with equestrian trails. In addition to enforcing Refuge restrictions, the Refuge staff would seek the cooperation of users and develop partnerships with interested groups to ensure compliance with compatibility stipulations and protection of Refuge resources.

Groups of more than 10 horses and riders would be required to obtain an SUP, because equestrian groups could restrict use for other wildlife-dependent users due to limited space both on trails and in parking lots. Special group events such as competitions, poker rides, and the like would not be allowed on the Refuge. Riders would not be allowed to tie a horse to any physical structure or vegetation and must remain with their horses at all times. The Refuge would not provide support facilities such as trailer parking, hitching posts, and water access. Per multiuse trail etiquette, pedestrians and bicyclists must yield to equestrians.

Jogging. Jogging would be allowed on all trails in open areas. Groups of more than 10 joggers would be required to obtain an SUP, because large groups may restrict use for other wildlife-dependent users due to limited trail space. Special events such as competitions, training, and practice meets

would not be allowed on the Refuge because they are not wildlife-dependent events and would potentially impact visitors participating in wildlife-dependent recreational activities.

Bicycling. Bicycling would be allowed only on designated trails including the East Dike, Kingfisher, and Gotts Point Trails and the Observation Hill Trail System. Based on limited survey data, bicycling is not a common use on Refuge trails, and conflicts with other users have not been reported. However, bicycling sometimes has occurred off-trail, which is not allowed.

Special events such as racing (or other competitions) and/or practice would not be allowed on the Refuge. In addition, bicycling competitions would not be allowed to use Refuge parking areas for race preparations, starting lines, finish lines, or refreshment areas because the resulting congestion limits access by wildlife-dependent users and could cause automobile/bicycle safety concerns. Groups of more than 10 cyclists would be required to obtain an SUP, because large groups may restrict use for other wildlife-dependent users due to limited trail space. Bikes must be ridden at a safe speed, and cyclists must yield to horses and pedestrians. Refuge staff would seek the voluntary cooperation of users and would also rely on law enforcement to ensure compliance with these stipulations and to ensure safety of all user groups on trails.

Availability of Resources

Most of the costs associated with carrying out the improvements, as described in the Preferred Alternative, are one-time expenses (see Table B-3). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Increased volunteer assistance, strengthened existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. When provided appropriate training, Refuge volunteers, interns, and various user groups could assist with monitoring, education, and interpretation programs, and maintenance projects. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities using the same resource. For instance, upgrading the fire break to a multiuse trail would benefit horseback riding, jogging, and bicycling, but the trail could also be used by visitors engaged in wildlife observation, photography, and interpretation. This same cost has been shown in all CDs that would use the new trail facility.

Table B-3. Costs to Implement Improvements Necessary to Allow Horseback Riding, Jogging, and Bicycling

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*****Install multiple-use trail regulation signs	$7,800	$300
*****Upgrade fire break	$37,000	$800
Safety upgrade to Tio Lane walk-through	$1,000	
*****Print/reprint general Refuge brochures	$3,200	$800
*****Human/wildlife interaction disturbance studies	$140,000	
Miscellaneous management		
Total	**$189,000**	**$1,900**

Anticipated Impacts of the Use

The discussion below analyzes impacts of the use as proposed under Preferred Alternative 2.

Impacts to Habitat

Unpaved or unsurfaced trails are susceptible to a variety of trail impacts from horseback riding, jogging, and bicycling, including vegetation loss due to trampling and soil compaction and erosion (Adkison and Jackson 1996; Dale and Weaver 1974; Leung and Marion 2000). Trail widening and creation of side trailing (social trailing) increases the area of disturbed land (Liddle 1975). Horses, pedestrians (including joggers), and cyclists can all cause structural damage to plants and increase soil compaction and erosion (DeLuca et al. 1998; Whittaker 1978). Vegetation and soil compaction and erosion impacts can be much more pronounced from horses than hikers (Bainbridge 1974; Hammitt and Cole 1987; Hendee et al. 1990), with soil compaction as much as 1,500 pounds per square inch exerted on the soil surface with each step (Hendee et al. 1990). Hikers tend to flatten vegetation while horses tend to chum up soil, thus cutting plants off at the rootstalk (Whittaker 1978). Trail widening is also a consideration as horses tend to walk on the downslope sides of trails (Whitson 1974), creating a much wider area of disturbance and increasing trail maintenance problems. This can increase the spread of previously established nonnative species by providing loose, disturbed soil for germination and spreading reproductive plant structures.

These impacts are unlikely to occur on the well-defined, gravel surface of the East Dike, Kingfisher, and Gotts Point Trails and the Observation Hill Trail System trails, which is why they have been designated for these uses. Although equestrians, cyclists, and joggers would be required to remain on designated trails, if some users travel off-trail to access the lakeshore, a scenic vista, or other points of interest, then the habitat impacts noted above would result from development of social trails. Use of social trails would also cause wildlife disturbance.

Control of invasive plant species on the Refuge is a difficult and never-ending challenge. Roads and trails often function as conduits for movement of plant species, including nonnative, invasive species (Benninger-Truax et al. 1992; Hansen and Clevenger 2005). Horse droppings are a source of nonnative plant seeds that are capable of germination and growth on disturbed sites (Campbell and Gibson 2001). Bicycles are another potential seed dispersal mechanism. Refuge visitors can inadvertently carry propagules from invasive plants on their clothing or equipment, spreading those plants to new areas. Once established, invasive plants can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. Invasive plants on or near these trails would be controlled and monitored as part of the Refuge's IPM Plan (Appendix G).

Impacts to Wildlife

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species

that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from these uses would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

General Response of Wildlife to Disturbance

Immediate responses by wildlife to recreational activity can range from behavioral changes including nest abandonment, altered nest placement, and change in food habits to physiological changes such as elevated heart rates, increased energetic costs due to flight or flushing, or even death (Belanger and Bedard 1990; Kight and Swaddle 2007; Knight and Cole 1995; Miller and Hobbs 2000; Miller et al. 1998; Morton et al. 1989). The long-term effects are more difficult to assess but may include altered behavior, vigor, productivity, or death of individuals; altered population abundance, distribution, or demographics; and altered community species composition and interactions.

According to Knight and Cole (1991), there are three wildlife responses to human disturbance: avoidance, habituation, and attraction. The magnitude of the avoidance response may depend on a number of factors including the type, distance, movement pattern, speed, and duration of the disturbance; the time of day, time of year, weather; and the animal's access to food and cover, energy demands, and reproductive status (Fernández-Juricic et al. 2007; Gabrielsen and Smith 1995; Knight and Cole 1991).

Habituation is defined as a form of learning in which individuals stop responding to stimuli that carry no reinforcing consequences for the individuals that are exposed to them (Alcock 1993). A key factor for predicting how wildlife would respond to disturbance is predictability. Often, when a use is predictable—following a trail or boardwalk or at a viewing deck—wildlife will habituate to and accept human presence (Oberbillig 2000). Gabrielsen and Smith (1995) suggest that most animals seem to have a greater defense response to humans moving unpredictably in the terrain than to humans following a distinct (and repeated) path.

Burger (1999) as cited by Oberbillig (2000) suggests that viewing distances can serve as useful guides for managers lacking good site-specific information and serve as a starting point in determining what is appropriate elsewhere. Other factors that affect disturbance impact include the numbers of viewers, the time of day, and noise level. When exposing nonbreeding waterbirds to four types of human disturbances (walking, all-terrain vehicle, automobile, and boat), Rodgers and Smith (1997) conclude that a buffer zone of 330 feet would minimize flushing of foraging or loafing waterbirds. Vos et al. (1985) recommend buffer zones of 820 feet on land and 490 feet over water for great blue herons. Miller et al. (1998) found that the trail zone of influence for forest and grassland birds appears to be approximately 250 feet. Beyond this distance, bird abundance, species composition, and nest predation was not affected by even heavily used recreational trails. Knight and Cole (1991) suggest that sound may elicit a much milder response from wildlife if animals are visually buffered from the disturbance.

Horseback Riding. Horseback riding may influence the behavior of various wildlife species. Observations by Owen (1973) and others suggest that many species of wildlife are habituated to livestock and are less likely to flee when approached by an observer on horseback than by an observer on foot. In one study (Owen 1973), equestrians could approach geese up to a distance of

150 feet without noticeable behavioral changes in the geese. This is compared to a suggested hiking trail distance of 250 feet (Miller et al. 1998).

Jogging. As cited in Bennett and Zuelke (1999), joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because joggers move quickly and landscapers create more noise. The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986; Burger et al. 1995; Knight and Cole 1995). However, joggers tend to spend less time in a particular area than pedestrians and are less likely to directly approach or otherwise disturb wildlife. The effects of human disturbance can be reduced by restricting jogging to an established trail because wildlife show greater flight response to humans moving unpredictably than to humans following a distinct (and repeated) path (Gabrielsen and Smith 1995). Joggers would be restricted to an established, designated trail to prevent significant disturbance.

Bicycling. Rapid movement directly toward wildlife frightens animals, while movement away from or at an oblique angle to animals is less disturbing (Knight and Cole 1995). Human-caused noise, including road noise, has been shown to negatively affect wildlife (Bowles 1995), although the response is often difficult to assess because it may be confounded by responses to visual stimulus. Pease et al. (2005) showed that bicycles (and pedestrians) disturbed more dabbling ducks than did other means of transportation. Stalmaster and Newman (1978) suggest that sound may elicit a much milder response from wildlife if animals are visually buffered from the disturbance. Bicycling on designated trails is not anticipated to disturb wildlife because riders tend to stay on the trail and the noise source is predictable. In addition, group size would be limited by prohibiting special events and training on the Refuge, thereby reducing the potential for substantial disturbance to wildlife.

Potential Impacts to Priority Public Uses

Trails on public lands often attract a variety of user groups with conflicting needs. For instance, slow-moving uphill hikers may reduce the quality of experience of cyclists who enjoy the speed on a downhill single-track trail. Some trail users who meet horses or see, smell, or step in evidence of their use say it detracts from their experience (Watson et al. 1993), while some trail users may enjoy seeing and meeting horses. The number of encounters that create conflict at Deer Flat NWR is unknown. Horseback riding is an occasional use at Deer Flat NWR currently, and available parking for horse trailers would continue to limit its use. Should increased equestrian use of the Refuge result in conflicts for parking space, we would reassess the number of horses allowed on the Refuge at any given time.

Bicycles and horses using the same trail as pedestrians can sometimes create safety hazards for other visitors. Although user groups are not physically separated on the trails designated for bicycles and horses, the designated trails proposed for bicycles and horses are wide (between 12 and 20 feet), have good visibility, and should accommodate safe, shared use by pedestrians and joggers, as well as equestrians and bicyclists traveling at a safe speeds. If the number of trail users increases significantly, the potential for accidents or user group conflicts may also increase. Measures to reduce potential conflicts between equestrians and other user groups would include providing information at the trailhead kiosks, and in the Refuge’s brochure that clearly indicates permitted users and rules of conduct. Providing signs that clearly indicate which users have the right-of-way would help mitigate conflict, as is evident on other public lands in the area (e.g., Military Park in Boise). Trail etiquette signing would state the proper hierarchy of yields and other rules of the trail.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register.
- Distributed approximately 1,300 copies of Planning Update 1.
- Provided informational presentations to 26 local organizations.
- Held evening call-in hours the second and fourth Wednesdays of the month.
- Held open houses July 28, August 20, and August 21.
- Contacted visitors over eight days in July and August and handed out over 700 flyers.
- Over 1,000 comments were received.

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list.
- Provided informational presentations to 28 local organizations.
- Held open houses on June 3, June 4, July 8, and July 9.
- Attended local festivals.
- Almost 350 comments were received.

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
____X____ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- Horseback riding, jogging, and bicycling would be allowed only on designated trails to minimize disturbance to wildlife and pedestrian users. Designated trails would be:
    - Observation Hill Trail System in the North Side Recreation Area.
    - East Dike and Kingfisher Trails in the East Side Recreation Area.
    - Gotts Point Trail
- The Refuge would not improve designated trails or provide additional trails or facilities to accommodate increased use by equestrians, joggers, or cyclists.

- Horses and cyclists would be required to maintain safe speeds conducive to multiuse trails. Pedestrians and bicyclists must yield to equestrians.
- Organized horseback riding, bicycling, or jogging groups of more than 10 people may be permitted under an SUP issued to the group leader. Groups involved in competitive events or training for competitive events (e.g., cross-country training or cross-country meets) would not be allowed.
- Equestrians would be required to remain with their horses at all times and not tie a horse to any physical structure or vegetation while on the Refuge.
- Use would be restricted to daylight hours only.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
        - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
    - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
    - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
    - Wildlife closure at Gotts Point from October 1 through January 31.
    - Wildlife closure at Murphy’s Neck from October 1 through March 15.
    - Wildlife closure at Lower Dam Recreation Area from October 1 through April 14.
- Refuge staff would monitor impacts of these activities annually to assess compliance with these stipulations, impacts to wildlife and wildlife habitat, and conflicts between user groups. Monitoring data would be used to modify these stipulations or remove the use if necessary to ensure continued compatibility of these activities.

Justification

Horseback riding, jogging, and bicycling are not wildlife-dependent public uses of the Refuge, as defined by statute (16 U.S.C. 668dd et seq.). However, these uses of the existing trails are secondary uses that can facilitate wildlife-dependent uses. Managed under the stipulations listed above, these uses are expected to result in only minor additional impacts to wildlife. Restricting the disturbance to an established trail would increase predictability of public use patterns on the Refuge, allowing wildlife to habituate to nonthreatening activities.

Although horseback riding, jogging, and bicycling can result in disturbance to wildlife, disturbance is expected to occur in limited areas of the Refuge. There are adequate amounts of undisturbed habitat available to wildlife for escape and cover.

It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge would not be measurably lessened from these activities. The relatively limited number of individuals expected to be adversely affected due to disturbance would not cause wildlife populations to materially decline, the physiological condition and production of wildlife species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing these uses to occur with stipulations would not materially detract or interfere with the purposes for which the Refuge was established or the Refuge System mission.

Mandatory reevaluation Date

__2024___ Mandatory 10-year reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

___X____ Environmental Impact Statement and Record of Decision

References

Adkison, G.P. and M.T. Jackson. 1996. Changes in ground-layer vegetation near trails in midwestern U.S. forests. Natural Areas Journal 16:14-23.

Alcock, J. 1993. Animal behavior: an evolutionary approach. 5th ed. Sunderland, MA: Sinauer Associates.

Bainbridge, D.A. 1974. Trail management. Ecological Society of America Bulletin 55:8-10.

Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

Bennett, K.A. and E. Zuelke. 1999. The effects of recreation on birds: a literature review. Delaware Natural Heritage Program. Smyrna, DE. 18 pp.

Benninger-Truax, M., J.L. Vankat, and R.L. Schaefer. 1992. Trail corridors as habitat and conduits for movement of plant species in Rocky Mountain National Park, CO. Landscape Ecology 6(4):269-278.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Bowles, A.E. 1995. Responses of wildlife to noise. Pages 109-156 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Campbell, J.E. and D.J. Gibson. 2001. The effect of seeds of exotic species transported via horse dung on vegetation along trail corridors. Plant Ecology 157:23-35.

Dale, D. and T. Weaver. 1974. Trampling effects on vegetation of the trail corridors of north Rocky Mountain forests. Journal of Applied Ecology 11:767-772.

DeLuca, T.H., W.A. Patterson, W.A. Freimund, and D.N. Cole. 1998. Influence of llamas, horses, and hikers on soil erosion from established recreation trails in western Montana. USA Environmental Management 22(2):255-262.

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Hammitt, W.E. and D.N. Cole. 1987. Wildland recreation: ecology and management. New York: John Wiley.

Hansen, M.J. and A.P. Clevenger. 2005. The influence of disturbance and habitat on the presence of nonnative plant species along transport corridors. Biological Conservation 125(2005):249-259.

Hendee, J.E., G.H. Stankey, and R.E. Lucas. 1990. Wilderness management. Golden, CO: North American Press.

Kight, C.R. and J.P. Swaddle. 2007. Associations of anthropogenic activity and disturbance with fitness metrics of eastern bluebirds (*Sialia sialis*). Biological Conservation 138(1-2):189-197.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Leung, Y. and J.L. Marion. 2000. Recreation impacts and management in wilderness: a state-of-knowledge review. Pages 23-28 in: D.N. Cole, S.F. McCool, W.T. Borrie, and J. O'Loughlin, compilers. Wilderness science in a time of change conference—volume 5: wilderness ecosystems, threats, and management; 1999 May 23-27; Missoula, MT. Proceedings RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 395 pp.

Liddle, M.J. 1975. A selective review of the ecological effects of human trampling on natural ecosystems. Biological Conservation 7:17-36.

Miller, J.R. and N.T. Hobbs. 2000. Recreational trails, human activity, and nest predation in lowland riparian areas. Landscape and Urban Planning 50(4):227-236.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8(1):162-169.

Morton, J.M., A.C. Fowler, and R.L. Kirkpatrick. 1989. Time and energy budgets of American black ducks in winter. Journal of Wildlife Management 53:401-410.

Oberbillig, D.R. 2000. Providing positive wildlife viewing experiences. Deborah Richie Communications. Missoula, MT.

Owen, M. 1973. The management of grassland areas for wintering geese. Wildfowl 24:123-130.

Pease, M.L., R.K. Rose, and M.J. Butler. 2005. Effects of human disturbances on the behavior of wintering ducks. Wildlife Society Bulletin 33(1):103-112.

Rodgers, J.A., Jr. and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25(1):139-145.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. Journal of Wildlife Management 42:506-513.

Vos, D.K., R.A. Ryder, and W.D. Graul. 1985. Response of breeding great blue herons to human disturbance in northcentral Colorado. Colonial Waterbirds 8:13-22.

Watson, A.E., M.J. Niccolucci, and D.R. Williams. 1993. Hikers and recreational stock users: predicting and managing recreation conflicts in three wildernesses. Intermountain Research Station Research Paper INT-468. U.S. Forest Service. 37 pp.

Whitson, P.D. 1974. The impact of human use upon the Chisos Basin and adjacent lands. Scientific Monograph Series Number 4. National Park Service. 92 pp.

Whittaker, P.L. 1978. Comparison of surface impact by hiking and horseback riding in the Great Smoky Mountain National Park. Management Report 24. U.S. Department of the Interior, National Park Service. 80 pp.

Compatibility Determination for Horseback Riding, Jogging, and Bicycling (B.4)

Use is compatible with stipulations.

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager/
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge
Supervisor: _____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

B.5 Compatibility Determination for Hunting Deer

RMIS Database Uses: Hunting (deer)

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge, respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assumed the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

Hunting is considered a wildlife-dependent public use of the Refuge, as defined by statute (16 U.S.C. 668dd et seq.) and must be given priority over nonwildlife-dependent uses. Despite the direct and indirect impacts associated with sport-hunting, regional deer populations are not likely to be affected significantly by hunting on the Snake River Islands or Lake Lowell Unit of the Refuge.

Deer hunting takes place between Parking Lot 8 and the New York Canal on Lake Lowell Unit and on all islands in the Snake River Islands Unit. A limited number of doe and buck tags are issued to hunters for use at Lake Lowell Unit. These hunters are also required to follow special conditions outlined in their Refuge hunt permit. The Snake River Islands fall within several big game hunting units and follow hunting regulations published by Oregon Department of Fish and Wildlife (ODFW) and Idaho Department of Fish and Game (IDFG) for the unit in which each island is located.

Proposed Changes to Described Uses

There are no changes proposed to the deer hunting program as described above.

Availability of Resources

The proposed deer hunt would not require any additional infrastructure. Hunter access to the proposed hunt area would be accommodated at existing Parking Lots 1 to 8 and from on-water access to the islands. Permanent blinds, additional trails, and roadway pullouts would not be constructed to support the hunt program. Hunter access would be restricted to pedestrian access only; all-terrain vehicles (ATVs) and pack animals are not permitted.

Administration of the hunt program would add workload for existing staff. The Refuge would incur the annual expense of editing and producing media related to the deer hunting opportunity. Monitoring efforts would need to be increased to determine the program's impacts to Refuge deer populations and other Refuge resources. The simple administration of the program would add annual workload to the biological, management, and public use staff. It is expected that the Service and IDFG law enforcement personnel would assist with any enforcement-related problems. The Refuge has adequate staff and base funding to cover the additional workload and costs. For a breakdown of anticipated cost of the deer hunting program, see Table B-4.

Table B-4. Costs to Implement Improvements to the Deer Hunting Program

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
Coordination with IDFG and program management		$5,000
Deer monitoring, resource monitoring, hunt plan updates, coordination, program management		$5,000
Coordination with IDFG and patrols		$5,000
*****Outreach, production of media, program management	$7,000	$5,000
*****Quality of wildlife-dependent public uses survey	$75,000-$80,000	
*****Human/wildlife interaction disturbance studies	$140,000	
*Law enforcement officer		$62,400
Maintain signage		$300
Total	**$222,000-$227,000**	**$82,700**

Anticipated Impacts of the Use

Impacts to Habitat

Foot travel associated with deer hunting could potentially result in trampling of vegetation and minor impacts to subcanopy riparian cover. Since deer hunting would involve small numbers of spatially dispersed hunters, and primarily take place during the time of year when most understory plants are dormant, this activity would likely have little direct impact on any native plant species. Although impacts to habitats within the hunt area are expected to be minor, as noted above, other habitats could be impacted from increased grazing and browsing should deer move away from the hunt zone. The redistribution of deer from the hunting zone may increase deer density within other nearby suitable habitat areas. Through trampling and direct herbivory, habitat conditions could be reduced within riparian, shrub-steppe, and agricultural areas. Higher densities over prolonged times can have impacts to habitat structure as young plants are consumed, suppressing the number of potential recruits into older age classes.

Impacts to Soil and Water

Minimal disturbance is anticipated to soils and water due to the dispersed nature of the activity. Additionally, the hunt uses existing infrastructure for parking and pedestrian access.

Impacts to Wildlife

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species, only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from hunting would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Impacts of Hunting on Deer

Hunting by its nature results in the direct take of individual animals, as well as wounding and disturbance. In all cases, the Refuge would seek to minimize needless deer mortality, while providing a quality hunt experience. With regional deer populations exceeding 55,000 animals (McDonald 2011), deer hunting on Deer Flat NWR would not result in negative cumulate impacts to deer populations.

Deer hunting can have indirect impacts to habitat by reducing populations or redistributing deer, thereby changing densities of deer in a given area. Mule deer are largely dependent upon the fat stored during the spring, summer, and fall to survive winter. Even in the best winter range, deer lose

weight throughout the winter. A main strategy for winter survival is securing habitat with adequate thermal cover to conserve energy by becoming sedentary. Energy loss would be minimized by the presence of sufficient food resources in close proximity to cover habitat (IDFG 2010). Due to the limited number of hunters using the Snake River Islands for deer hunting and the existence of areas of Lake Lowell that are off limits to deer hunting, deer would continue to find adequate thermal cover.

Impacts to Nontarget Species

The activity of hunting deer on the Refuge could also disturb some wildlife species. Periodic firearm discharge in close proximity to wetlands or other waterfowl roosting and feeding areas can result in behavioral responses by waterfowl and other wetland birds. This disturbance would be limited in scope by the limited number of hunters in an area at any given time. The rate of gunfire disturbance is expected to be infrequent and random, based upon opportunistic individual shots or shot clusters at deer in range. The frequency of gunfire may be only a few shots per day causing temporary and short-term disturbance to wintering waterfowl and waterbirds.

The controlled deer hunt season may impose some short-term effects to wintering bald eagle use within hunted areas. Wintering populations of bald eagles have shown susceptibility to disturbance, resulting in disrupted foraging behavior and changes in social dynamics between other species in the avian scavenger guild (Skagen et al. 1991) and avoidance of areas with high disturbance (Stalmaster and Newman 1978). Stalmaster and Newman (1978) also found that recreational activities occurring within 250 meters of roosting and foraging areas resulted in changes in distribution patterns by displacement to areas of lower human activity. With regard to hunting, Stalmaster and Newman (1978) found that gunshots were the only noises that elicited overt escape behavior by eagles in their study. The areas open to hunting incorporate riparian woodlands that could serve as roosting habitat for wintering eagles. The hunted area at Lake Lowell is adjacent to an area that is used by bald eagles for foraging, potentially placing hunters within 250 meters of roosting and foraging eagles. As a result of hunting disturbance, perches and foraging areas within closed areas or islands with lower hunting pressure may see a higher frequency of eagle use during the hunt season.

Site selection and nesting activity for bald eagle nests and heron colonies may initiate in late January. The general hunting seasons are complete before this timeframe. If a late-season depredation hunt occurred at Lake Lowell Unit, a regulated number of hunters may be introduced to suitable habitat during this period. The depredation season is anticipated to have low hunter density, producing only few shots per depredation permit. The impact to nesting eagles and herons is not likely to be major. The framework of the depredation hunt additionally allows the Refuge to selectively close areas, as detected, to protect sensitive wildlife resources within the hunt area with spatial buffers. Resource buffers would be employed using current research to sufficiently safeguard nests or colonies from abandonment. As closures are implemented, the Refuge would supply hunt permit holders maps of closures to hunting activity.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register.
- Distributed approximately 1,300 copies of Planning Update 1.
- Provided informational presentations to 26 local organizations.
- Held evening call-in hours the second and fourth Wednesdays of the month.
- Held open houses July 28, August 20, and August 21.
- Contacted visitors over eight days in July and August and handed out over 700 flyers.
- Over 1,000 comments were received.

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list.
- Provided informational presentations to 28 local organizations.
- Held open houses on June 3, June 4, July 8, and July 9.
- Attended local festivals.
- Almost 350 comments were received.

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
___X___ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

Deer Flat NWR General Deer Hunt Stipulations

- Hunters must comply with the applicable provisions of State and Federal laws, as well as the hunting regulations of the State of Idaho.
- No permanent structures would be constructed on Service lands.
- Use of dogs to hunt or pursue big game is prohibited.
- No person including, but not limited to, a guide, guide service, outfitter, club, or other organization would provide assistance, services, or equipment on the Refuge to any other person for compensation unless such guide, guide service, outfitter, club, or organization has obtained a Special Use Permit from the Refuge.
- Hunting by aid of or distribution of any feed, salt, other mineral, or electronic device, including game cameras, is prohibited.

- Deer hunters may enter the Refuge no earlier than two hours before shooting time and must leave the Refuge within two hours after shooting time. Unless retrieving a deer, retrieval times extend five hours past shooting time.

Lake Lowell Unit Deer Hunt Stipulations

- Deer hunting is permitted only in the areas between the shoreline of Lake Lowell and the Refuge's southern boundary, and extending from Parking Lot 8 southeasterly to the New York Canal.
- The use of flagging, blazing, or trail-marking devices to locate hunting area(s) or for any other purpose is prohibited.
- Hunters must obtain a Refuge-specific permit to hunt deer on the Lake Lowell Unit of the Refuge, which must be signed and carried in the field while hunting.
- Deer hunting would be limited to short-ranged weapons, as allowed in IDFG Game Management Unit 38. These weapons currently include muzzleloaders, archery equipment, crossbow, shotgun using slugs or shot of size #00 buck or larger, or a handgun using straight-walled cartridge not originally developed for rifles.
- All Lake Lowell Unit deer hunting would be from temporary tree stands.
- Each hunter is allowed to install non-damaging portable tree stands up to the maximum number allowed under 50 C.F.R. 32. The tree stands may be erected on, or after, the first day of their hunting season and must be removed by the last day of their season. Hunters must permanently affix their name, contact phone number, and address to their deer stand(s).
- Use of nails, wires, screws, or bolts to attach a stand to a tree, or hunting from a tree into which a metal object has been driven, is prohibited.
- Lake Lowell Unit deer hunters must use a Fall-Arrest System (FAS)/Full Body Harness meeting Treestand Manufactures Association (TMA) standards while using a tree stand. It shall be unlawful to use a tree stand without permission of the owner.
- Lake Lowell Unit deer permit holders would be limited to designated parking areas. Access would be walk-in only from existing Parking Lots 1 through 8.
- Lake Lowell Unit hunting permit holders must be accompanied by a Refuge employee or State Game Warden to retrieve a wounded or expired deer from a Closed Area.
- Terrestrial-based stalking and/or still hunting is not permitted at any time. Shooting (firearm or bow) from the ground is not permitted, except to dispatch wounded deer.
- Deer drives are prohibited.

Justification

Hunting, when compatible, is defined as one of the priority public uses of the Refuge System by the National Wildlife Refuge System Improvement Act of 1997. The Refuge hunt program will be designed to provide a quality hunt and a safe experience, with a reasonable opportunity to harvest game species. No habitat degradation would be anticipated by continuing the deer hunt program; disturbance to birds and other wildlife, if any, would be temporary and localized, and ample amounts of additional quality habitat for these wildlife species exist on the Refuge. Thus, it is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge and local area would not be measurably lessened from hunting activities. The number of individuals expected to be removed from the deer population due to hunting would not impair the physiological condition and production of hunted species.

The Refuge environment includes wildlife, soils, vegetation, air quality, and water quality. Some disturbance to the Refuge environment is anticipated, but impacts would be minor due to the dispersed nature of the activity, entailing a limited number of participants over the duration of the hunt season. State and Federal regulations and Refuge-specific special conditions would help reduce or eliminate any unwanted impacts of the use to nontarget species. The Refuge would implement, as needed, spatial and/or temporal closures to protect sensitive nontarget wildlife resources such as eagle nests or wintering waterfowl. The proposed hunt is not anticipated to have any impact on threatened or endangered species, as none are known to occur in the hunting area.

Specific Refuge regulations help safeguard Refuge habitat and adjoining private property. Disturbance to other wildlife would occur, but this disturbance is generally short term, with sufficient habitat being present in adjacent areas. The deer harvest would not significantly affect the regional population of deer. For these reasons, deer hunting would not prevent the Refuge from fulfilling the purposes of the Fish and Wildlife Act, Executive Order 7655, the Migratory Bird Conservation Act, the Refuge Recreation Act, or the mission of the National Wildlife Refuge System for conserving, managing, restoring, and protecting wildlife resources. In addition, the proposed hunt is anticipated to have a positive benefit to adjoining agricultural lands by alleviating localized depredation impacts.

In summary, deer hunting at Deer Flat NWR would not have any significant impacts to hunted species, to the regional populations of these species, to the Refuge environment, to adjacent lands, or to nearby residents. By allowing public hunting, the Refuge is fulfilling the mission of the National Wildlife Refuge System by administering Refuge resources for the benefit of present and future generations. For these reasons, we have determined that deer hunting would not materially interfere with or detract from fulfilling Refuge purposes and the mission of the National Wildlife Refuge System.

Mandatory reevaluation Date

__2029__ Mandatory 15-year reevaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

References

IDFG (Idaho Department of Fish and Game). 2010. Project W-170-R-34: Annual Report, Mule Deer Study I, Job 2, July 2, 2009 to June 30, 2010. Idaho Department of Fish and Game. Boise, ID. 97 pp.

McDonald, L. 2011. Personal communication between Lester McDonald, Idaho Department of Fish and Game Landowner/Sportsman Relations Coordinator, and Eric Anderson, Ridgefield National Wildlife Refuge Complex Instructional Systems Specialist, November 2011.

Skagen, S.K., R.L. Knight, and G.H. Orians. 1991. Human disturbance of an avian scavenging guild. Ecological Applications 1:215-225.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. Journal of Wildlife Management 42:506-513.

Compatibility Determination for Hunting Deer (B.5)

Use is compatible with stipulations.

Prepared by:	_____	_____
	(Signature)	(Date)
Refuge Manager/ Project Leader Approval:	_____	_____
	(Signature)	(Date)

Concurrence:

Refuge Supervisor:	_____	_____
	(Signature)	(Date)
Regional Chief, National Wildlife Refuge System:	_____	_____
	(Signature)	(Date)

B.6 Compatibility Determination for Hunting Waterfowl and Upland Birds

RMIS Database Uses: Hunting (waterfowl), Hunting (upland bird), Hunting (other migratory birds)

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future

generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

Hunting is considered a wildlife-dependent public use of the Refuge, as defined by statute (16 U.S.C. 668dd et seq.) and must be given priority over nonwildlife-dependent uses. Waterfowl, upland game bird, and other migratory bird hunting are defined as priority public uses under the National Wildlife Refuge Improvement Act of 1997 (Public Law 105-57). Despite the direct and indirect impacts associated with sport-hunting waterfowl, upland game birds, and other migratory birds, flyway populations are not likely to be affected significantly by the hunting program on the Refuge. Changes in regional land uses (e.g., agriculture versus housing) are more likely to influence population trends than localized hunting programs.

Waterfowl and upland game bird hunting is open on both units of the Refuge during the general seasons designated by the Idaho Department of Fish and Game (IDFG) or Oregon Department of Fish and Wildlife (ODFW) as appropriate. Regulations for these hunts generally follow the respective state's rules. Where the Snake River is the boundary between Idaho and Oregon, hunters from either state may hunt the islands according to the regulations of the state for which they are licensed. Hunters are allowed off-trail use within designated Refuge hunting areas. Nontoxic shot is required, and hunters may not possess lead shot in the field. While hunter use of these areas has not been closely monitored, the 2006 National Survey of Fishing, Hunting and Wildlife-associated Recreation showed that between 1996 and 2006, the number of state-resident hunters decreased by 33 percent (USFWS and U.S. Census Bureau 2007). Given this trend, it is unlikely that hunting would increase substantially in the near future. However, the number of hunters and their impacts would be monitored, and, if necessary, additional measures will be developed in coordination with IDFG and ODFW to protect Refuge resources.

Waterfowl Hunting on the Lake Lowell Unit

The Lake Lowell Unit falls completely within a goose hunting closure area designated by IDFG. Waterfowl hunting (duck, coot, and common snipe but excluding goose) takes place in the South Side Recreation Area between Parking Lots 1 and 8 and in the East Side Recreation Area from the Leavitt Tract to the east side of Gotts Point. Waterfowl seasons are consistent with the State season and typically start the first of October and run through the end of January. Lake Lowell is closed to recreational boaters during the hunting season. Walk-in hunting is allowed in both areas, and hunters may use a human- or electric-powered boat up to 200 yards from the shore in the South Side Recreation Area. An estimated 2,518 acres (24 percent) of the Lake Lowell Unit is open to waterfowl hunting. Hunters may use Parking Lots 1 through 8 to access the South Side Recreation Area. To access the East Side Recreation Area, hunters can use the Tio Parking Lot at the end of Tio Lane and park at the end of Greenhurst Road near Gotts Point. There were approximately 5,100 waterfowl hunting visits to the Refuge in the 2010 to 2011 hunting season.

Waterfowl Hunting on the Snake River Islands Unit

Currently all islands in the Snake River Islands Unit (approximately 1,200 acres) are open to waterfowl hunting (ducks, geese, coot, and common snipe). Waterfowl seasons are consistent with the State season and typically start the first of October and run through the end of January. No facilities are offered on any of the islands, but hunters are permitted to launch their boats from

various access points along both of the outer banks of the Snake River. Other public uses of the Snake River Islands Unit are thought to be low and would not conflict with this use.

Upland Game Bird Hunting on the Lake Lowell Unit

Upland game bird hunting (dove, ring-necked pheasant, California and bobwhite quail, and chukar and gray partridge) is allowed in both the South Side and East Side Recreation Areas at the Lake Lowell Unit. An estimated 2,518 acres of the Lake Lowell Unit is open to upland game bird hunting, though some portions are seasonally flooded. Seasons are consistent with the State seasons and typically start the first of September (for dove) and run through the end of January (for partridge). Hunters may use Parking Lots 1 through 8 to access the South Side Recreation Area. To access the East Side Recreation Area hunters can use the Tio Parking Lot at the end of Tio Lane and park at the end of Greenhurst Road near Gotts Point. Hunting is allowed in both the South Side Recreation Area and the East Side Recreation Area. Kingfisher Trail in the East Side Recreation Area is frequented by visitors other than hunters, which may cause minor conflicts. There were approximately 1,200 upland game bird hunting visits to the Refuge in the 2010 to 2011 hunting season.

Upland Game Bird Hunting on the Snake River Islands Unit

Upland game bird hunting (dove, ring-necked pheasant, California and bobwhite quail, and chukar and gray partridge) is allowed on all islands in the Snake River Islands Unit. Seasons are consistent with the State seasons and typically start the first of October and run through the end of January. No facilities are offered on any of the islands, but hunters are permitted to launch their boats from various access points on the Snake River. Other public uses of the Snake River Islands Unit are thought to be low and would not conflict with this use.

Proposed Changes to Described Uses

Under Preferred Alternative 2, hunting on Deer Flat NWR would not change from current conditions except for the following:

- Hunters would be required to stay out of any seasonal closures around important wildlife areas (e.g., shorebird feeding areas).
- Waterfowl hunting:
    - A limit of 25 shotgun shells per day per hunter would be implemented.
    - The waterfowl hunt season on Snake River Islands would be shortened if it is shown to be necessary by analysis/study of goose nesting.
    - An ADA-compliant hunting blind would be provided at appropriate location(s) available to parties with at least one IDFG-issued disabled hunt licensed hunter.

Availability of Resources

Deer Flat NWR is open to all of the priority, wildlife-dependent recreational activities, including hunting, and the infrastructure is there for all of these user groups. Improvements and projects described in the Preferred Alternative should increase the quality and safety of the Refuge hunt program. Most of the costs associated with carrying out the improvements described in the Preferred Alternative are one-time expenses (see Table B-5). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities using the same resource. For instance, installing a new accessible dock would benefit hunters, but the dock may also be used by visitors engaged in wildlife observation, photography, interpretation, and fishing. This same cost has been shown in all CDs that may use the new dock.

Table B-5. Costs to Implement Improvements to the Hunting Program

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Install hunt area signs	$1,100	$300
*Install and maintain accessible hunting dock	$25,000	$2,000
*Install and maintain vault toilet at Parking Lot 1	$60,000	$1,500
*Quality of wildlife-dependent public uses survey	$75,000-$80,000	
*Human/wildlife interaction disturbance studies	$140,000	
*Law enforcement officer		$62,400
Total	**$301,000-$306,100**	**$66,200**

Anticipated Impacts of the Use

The discussion below analyzes impacts of the proposed use under Preferred Alternative 2.

General Impacts to Habitat

The primary impact hunters have on habitat is the trampling of vegetation and creation of social trails. Trail widening and creation of social trails increases the area of disturbed land (Adkison and Jackson 1996; Dale and Weaver 1974; Liddle 1975). Pedestrians can potentially cause structural damage to plants and increase soil compaction and erosion (DeLuca et al. 1998; Whittaker 1978). These impacts are unlikely to occur on the well-defined, gravel surface of Refuge trails; however, social trails associated with off-trail use remain an issue for refuge managers because plants are trampled and wildlife is disturbed. Because hunting requires off-trail use in the pursuit and/or recovery of game, this concern is difficult to mitigate.

Control of invasive plant species on the Refuge is a difficult and never-ending battle. Roads and trails often function as conduits for movement of plant species, including nonnative, invasive species (Benninger-Truax et al. 1992; Hansen and Clevenger 2005). Propagules of nonnative plants can be transported into new areas on hunters' boots, clothing, dogs, and equipment. Once established, invasive plants can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. Invasive plants would be controlled and monitored as part of the Refuge's IPM Plan (Appendix G).

Local Impacts to Waterfowl Habitat

The impact of waterfowl hunters on the waterfowl habitat of both Refuge units is expected to be minor. The hunting season starts and ends outside of the growing season of most plants, so trampling and the spread of invasive plants are not major issues. There is a possibility of boats used for waterfowl hunting aiding in the spread of aquatic invasive species into the waters of the Refuge. Informational media in hunting brochures, placards at Refuge launch areas, periodic inspections, and early detection monitoring help reduce the likelihood of infestation. The creation of social trails in the soil may be more of an issue but is still expected to be minor because most hunters spread out in available habitat as a way to reduce overcrowding. Impacts to the water in waterfowl hunting come

mostly from the deposition of trash (including shell casings) by hunters; this problem would be mitigated through proper law enforcement.

Local Impacts to Upland Bird Habitat

At current levels, impacts to upland bird habitat are expected to be minor. Upland bird hunters do not consider either unit of Deer Flat NWR a destination hunt area, and local use is relatively low compared to the surrounding area. The hunting season starts and ends outside of the growing season of most plants, so trampling and the spread of invasive plants are not expected to be major issues. The creation of social trails may be more of an issue but is still expected to be minor because most hunters follow the irregular patterns of their quarry.

Impacts to Wildlife

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from hunting would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

General Impacts to Wildlife

Hunting, by its nature, results in the intentional take of individual animals, as well as wounding and disturbance (DeLong 2002). It can also alter behavior (e.g., foraging time), population structure, and distribution patterns of wildlife (Bartelt 1987; Madsen 1995; Owens 1977; Raveling 1979; White-Robinson 1982). In addition to loss of individual target species, hunting causes disturbance to nontarget species because of noise (most notably the report of a firearm), human presence, and general disturbance associated with the activity. Hunting results in the increase of nontarget species being injured or killed (accidentally or intentionally) in addition to target species being crippled or killed and not retrieved. Disturbances to waterfowl caused by human activity (including hunting) are manifested by alertness, fright (obvious or unapparent), flight, swimming, disablement, or death in nontarget species (Korschgen and Dolgren 1992).

Immediate responses by wildlife to recreational activity can range from behavioral changes including nest abandonment, altered nest placement, and change in food habits to physiological changes such as elevated heart rates, increased energetic costs due to flight or flushing, or even death (Belanger and Bedard 1990; Kight and Swaddle 2007; Knight and Cole 1995; Miller and Hobbs 2000; Miller et al. 1998; Morton et al. 1989). The long-term effects are more difficult to assess but may include altered behavior, vigor, productivity or death of individuals; altered population abundance, distribution, or demographics; and altered community species composition and interactions.

According to Knight and Cole (1991), there are three wildlife responses to human disturbance: avoidance, habituation, and attraction. The magnitude of the avoidance response may depend on a number of factors including the type, distance, movement pattern, speed, and duration of the disturbance; the time of day, time of year, weather; and the animal's access to food and cover, energy demands, and reproductive status (Fernández-Juricic et al. 2007; Gabrielsen and Smith 1995; Knight and Cole 1991).

Habituation is defined as a form of learning in which individuals stop responding to stimuli that carry no reinforcing consequences for the individuals that are exposed to them (Alcock 1993). A key factor for predicting how wildlife would respond to disturbance is predictability. Often, when a use is predictable—following a trail or boardwalk or at a viewing deck—wildlife will habituate to and accept human presence (Oberbillig 2000). Gabrielsen and Smith (1995) suggest that most animals seem to have a greater defense response to humans moving unpredictably in the terrain (as hunters do) than to humans following a distinct (and repeated) path.

Hunting can contribute indirectly to the well-being of wildlife by providing financial, educational, and sociological benefits to hunters. Hunting has given many people a deeper appreciation of wildlife and a better understanding of the importance of wildlife and habitat conservation, which ultimately contributes to the NWRS mission. The hunting community remains the largest support base for funding wildlife management programs, and refuges provide an opportunity for a high-quality waterfowl hunting experience to all citizens regardless of economic standing. Many individual refuges have developed extensive public information and education programs bringing hunters into contact with refuge activities and facilitating awareness of wildlife issues beyond hunting. Hunting is one of the six priority public uses of the NWRS.

Impacts of Hunting on Waterfowl

Waterfowl are wary, seeking refuge from all forms of disturbance but particularly those associated with loud noise and rapid movement (Korschgen and Dolgren 1992). Numerous studies show human activities associated with hunting (boating, vehicle disturbance, human presence) cause increased flight time in waterfowl species, which requires a considerable amount of energy (Havera et al. 1992; Kahl 1991; Kenow et al. 2003; Knapton et al. 2000). Human disturbance compels waterfowl to change feeding habits, so that they may feed only at night or may desert feeding areas entirely, resulting in weight loss (Korschgen and Dolgren 1992).

The hunting of waterfowl in the United States is based upon a thorough regulatory setting process that involves numerous sources of waterfowl population and harvest monitoring data. Waterfowl populations throughout the United States are managed through an administrative process known as flyways, of which there are four (Pacific, Central, Mississippi, and Atlantic). Idaho is included in the Pacific Flyway. A review of the policies, processes, and procedures for waterfowl hunting is covered in a number of documents.

Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds be closed unless specifically opened by the Secretary of the Interior, the Service annually promulgates regulations (50 C.F.R. 20) establishing the Migratory Bird Hunting Frameworks. The frameworks are essentially permissive, in that hunting of migratory birds would not be permitted without them. Thus, in effect, annual Federal regulations both allow and limit the hunting of migratory birds. The Migratory Bird Hunting Frameworks provide season dates, bag limits, and other options for states to select from, which should result in the level of harvest determined to be

appropriate based upon Service-prepared annual biological assessments detailing the status of migratory game bird populations. In North America, the process for establishing waterfowl hunting regulations is conducted annually. In the United States, the process involves a number of scheduled meetings (e.g., Flyway Study Committees, Flyway Councils, Service Regulations Committee) in which information regarding the status of waterfowl populations and their habitats is presented to individuals within the agencies responsible for setting hunting regulations. In addition, public hearings are held and the proposed regulations are published in the Federal Register to allow public comment.

For waterfowl, annual assessments used in establishing the Frameworks include the Breeding Population and Habitat Survey, which is conducted throughout portions of the United States and Canada. This survey is used to establish an annual Waterfowl Population Status Report. In addition, the number of waterfowl hunters and resulting harvest are closely monitored through both the Harvest Information Program and the Parts Survey (in which biologists gather at “wing bees” to identify duck wings and goose tails submitted by hunters). Since 1995, such information has been used to support the adaptive harvest management (AHM) process for setting duck-hunting regulations. Under AHM, a number of decision-making protocols determine the choice (package) of predetermined regulations (appropriate levels of harvest) that make up the framework offered to states that year. Each state’s wildlife commission then selects season dates, bag limits, shooting hours, and other options from their respective Flyway package. Their selections can be more restrictive but cannot be more liberal than AHM allows. Thus, the level of hunting opportunity afforded each state increases or decreases each year in accordance with the annual status of waterfowl populations.

Season dates and bag limits for national wildlife refuges open to hunting are never longer or larger than the state regulations. In fact, based upon the findings of an environmental assessment developed when a refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the state allows. Each national wildlife refuge considers the cumulative impacts to hunted migratory species through the Migratory Bird Frameworks published annually in the Service’s regulations on migratory bird hunting.

Local Impacts to Waterfowl

Hunting on refuges as a whole or on Deer Flat Refuge specifically is not likely to have an adverse effect on the status of any recognized waterfowl population in North America. Several points support this contention: (1) the proportion of national waterfowl harvest that occurs on national wildlife refuges is small; (2) there are no waterfowl populations that occur wholly or exclusively on national wildlife refuges; (3) annual hunting regulations within the United States are established to levels consistent with the current population status; (4) refuges cannot permit more liberal seasons than provided for in Federal frameworks; and (5) there are sufficient sanctuaries that exist on the Lake Lowell Unit to allow for undisturbed feeding and resting.

Waterfowl hunting on the north side of Lake Lowell is allowed only in the East Side Recreation Area. There are two sanctuaries, one on the southeastern end of the lake and the other on the northeastern side of the West Pool. These are closed to public entry (with the exception of a small number of permitted deer hunters in the southeastern sanctuary) throughout the year. These established sanctuaries on the Lake Lowell Unit in Refuge wetlands and fields ensure that wintering and migrating waterfowl, upland game birds, and other migratory birds, as well as nontarget species, can find food and rest areas on the Refuge even during the hunting season. Hunt regulations and

sanctuary would be continually monitored and evaluated to ascertain their value in balancing the disturbance caused by allowing hunting on the Refuge. Under the stipulations outlined above, this activity does not materially detract from meeting Refuge purposes or the Refuge System mission. Refuge-specific regulations are designed to minimize impacts and would be evaluated for their effectiveness annually.

Population and Harvest Data: The Federal Harvest Information Program estimates that 16,800 hunters in Idaho spent an average of 102,700 days hunting and harvested 225,100 ducks annually from 2001 through 2010. Over that same time period, the harvest information program estimates Idaho hunters harvested 59,800 Canada geese annually. This is the third highest total in the Pacific Flyway, behind Oregon and Washington, respectively. The number of waterfowl harvested on Deer Flat NWR is unknown; however, it is thought to be a small percentage of total numbers harvested in the state and even smaller in the Flyway.

Wintering Populations: Waterfowl use in and around the Refuge has been well documented and has seen some changes over time. Long-time residents fondly recall when the skies around Lake Lowell used to be "black with ducks." Annual Refuge narratives mirror these sentiments with photos and documentation of duck numbers in excess of half a million during the peak of migration. Those numbers have not been seen in the Treasure Valley since the late 1970s, probably due to the advent of "clean farming," conversion of farmland to housing development, natural shifts in the Flyway, and/or a variety of other factors. Numbers of ducks and geese in the valley continue to provide a quality hunting experience, and Deer Flat NWR is a waterfowl hunting destination for both local and out-of-state hunters.

The staff at Deer Flat NWR has performed winter waterfowl surveys since 1951, including ground-based point counts on the Lake Lowell Unit and aerial surveys on both units. Because birds can move long distances over short periods of time during the winter migration, these surveys are not considered an accurate measurement. Regional and local population surveys like the one performed at the Refuge are best understood as an index (best used to measure trends over time) and not a true census at any particular time. In recent years (from 2001 to 2010) peak numbers of geese (typically seen in November) on the Lake Lowell Unit averaged 11,892 annually. In the same decade, peak numbers of ducks (typically seen in December) averaged 61,535 on Lake Lowell annually.

Local Impact to Upland Birds

Population and Harvest Data: IDFG personnel perform surveys for California quail, pheasant, chukar, and grey partridge and assist in the mourning dove call counts. IDFG's 2010 Upland Game Progress Report notes that populations of the species of upland game birds that are legal to hunt on Deer Flat NWR are considered stable. The Refuge does not contribute any significant harvest numbers to the total estimated for the southwest region of the state and even less statewide. Of the previously listed species, mourning doves and California quail are thought to be hunted most, because the other species are here intermittently due to marginal habitat or are escaped farmed birds that do not survive the hunting season or the winter. Refuge staff does not currently perform any inventory or monitoring for any of the upland game bird species.

Impacts to Nontarget Species

It is expected that impacts to nontarget species would be minimal because hunting seasons do not coincide with nesting seasons, so reproduction would not be reduced by hunting. Disturbance to the

daily activities, such as feeding and resting, of wintering nonhunted birds might occur. Because the Refuge maintains sanctuary areas where no hunting is permitted, this effect is likely a minor negative effect. Refuge regulations further mitigate possible disturbance by hunters to nonhunted wildlife. Vehicles are restricted to roads and the harassment or taking of any nontarget wildlife is not permitted. Although ingestion of lead shot by nonhunted wildlife could be a cumulative impact, it is not relevant at the Refuge because nontoxic shot would be required.

Potential Impacts to Priority Public Uses

Trails on public lands attract a variety of user groups who often have conflicting needs. During the scoping period, some of the public expressed safety concerns with hunters using the same trails and small public use areas that are also accessed by wildlife observers and photographers. However, it is believed that this conflict is not a major concern. Even though nonhunters use the same trails as hunters, the proposed designated trails for the former are wide (between 12 and 20 feet) and have adequate visibility. If the number of nonhunters using trails open to hunting increases significantly, the potential for accidents or user group conflicts may also increase. There is also the potential for conflict between nonhunters, waterfowl hunters, and upland hunters using the same off-trail areas. Conflicts between hunters and nonhunters and between different types of hunters would be monitored and addressed if necessary. Measures to reduce potential conflicts between hunters and other user groups would include providing information at the trailhead kiosks, and in the Refuge's brochure that clearly indicates permitted users and rules of conduct.

No significant effects to roads, trails, or other infrastructure from the hunting program are foreseen. Normal road, trail, and facility upkeep and maintenance would continue to be necessary. Additional facility construction or upgrade, if needed, is addressed in the Availability of Resources section.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register
- Distributed approximately 1,300 copies of Planning Update #1
- Provided informational presentations to 26 local organizations
- Held evening call-in hours the second and fourth Wednesdays of the month
- Held open houses July 28, August 20, and August 21
- Contacted visitors over eight days in July and August and handed out over 700 flyers
- Over 1,000 comments were received

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list

- Provided informational presentations to 28 local organizations
- Held open houses on June 3, June 4, July 8, and July 9
- Attended local festivals
- Almost 350 comments were received

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
____X____ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- All hunting on the Refuge would require the appropriate State license and would occur consistent with applicable regulations designated by IDFG or ODFW as appropriate.
- Waterfowl and upland hunting would be allowed in the East Side and South Side Recreation Areas of the Lake Lowell Unit. Walk-in hunting would be allowed in both areas, and hunters may use a human- or electric-powered boat up to 200 yards from the shore in the South Side Recreation Area. Waterfowl hunting would not be allowed on foot from the ice.
- Waterfowl and upland hunting would be allowed on all islands in the Snake River Islands Unit. Where the Snake River is the boundary between Idaho and Oregon, hunters from either state may hunt the islands according to the regulations of the state for which they are licensed.
- Hunters would be required to stay out of any seasonal closures around important wildlife areas (e.g., shorebird feeding areas).
- Hunters are allowed off-trail use within designated hunting areas.
- Hunting would be provided on a first-come, first-served basis. Hunters would be allowed to operate motorized vehicles only on designated roads and parking areas.
- Nontoxic shot is required, and hunters may not possess lead shot in the field.
- Dogs may be used for waterfowl and upland game hunting. Dogs must be leashed unless actively hunting and remain under strict voice control at all times.
- Dog training other than that which occurs while actively hunting is prohibited on the Refuge.
- To improve safety and minimize conflict with other priority uses, signs would be posted at Refuge access points to notify Refuge users when a hunt is underway.
- Waterfowl hunting:
    - Although use of permanent blinds is prohibited, portable blinds are allowed if they are removed at the end of each day. Temporary blinds may be constructed from natural vegetation less than 3 inches in diameter and are available on a first-come, first-served basis.
    - A limit of 25 shotgun shells per day per hunter would be implemented.
    - There may be a shortened waterfowl season on Snake River Islands if it is shown to be necessary by analysis/study of goose nesting.
    - Youth hunt would be allowed within all designated waterfowl hunt zones.

    - Use would be restricted to waterfowl hunting shooting hours designated by IDFG or ODFW as appropriate.
    - There would be an evaluation to determine whether to charge a fee and/or institute a more structured hunt opportunity.
- Upland game bird hunting:
    - Use would be restricted to upland game bird hunting shooting hours designated by IDFG or ODFW as appropriate.
    - There would be an evaluation to determine whether to implement more restricted hunting hours to reduce conflicts with waterfowl hunters.
- Open fires would be prohibited.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
        - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
    - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
    - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
    - Wildlife closure at Gotts Point from October 1 through January 31.
    - Wildlife closure at Murphy’s Neck from October 1 through March 15.
    - Wildlife closure at Lower Dam Recreation Area from October 1 through April 14.
- Refuge staff would monitor impacts of these activities annually to assess compliance with these stipulations, impacts to wildlife and wildlife habitat, conflicts between user groups, and user satisfaction. Monitoring data would be used to modify these stipulations if necessary to ensure continued compatibility of these activities. Adjustments to timing of upland hunting or the use of hunt areas by nonhunters may be needed to ensure the use remains safe and compatible.

Justification

By following established State guidelines, implementing stipulations, and maintaining closed areas, this waterfowl and upland game bird hunting program would not interfere with the Refuge achieving its purposes of providing sanctuary and as a refuge and breeding grounds for migratory birds and

other wildlife. It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge would not be measurably lessened from allowing hunting to occur on the Refuge. The relatively limited number of individuals expected to be adversely affected due to hunting would not cause wildlife populations to materially decline, the physiological condition and production of wildlife species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing hunting to occur with stipulations would not materially detract or interfere with the purposes for which the Refuge was established or the Refuge System mission.

Mandatory reevaluation Date

__2029___ Mandatory 15-year reevaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

___X___ Environmental Impact Statement and Record of Decision

References

Adkison, G.P. and M.T. Jackson. 1996. Changes in ground-layer vegetation near trails in midwestern U.S. forests. Natural Areas Journal 16:14-23.

Alcock, J. 1993. Animal behavior: an evolutionary approach. 5th ed. Sunderland, MA: Sinauer Associates.

Bartelt, G.A. 1987. Effects of disturbance and hunting on the behavior of Canada goose family groups in east central Wisconsin. Journal of Wildlife Management 51:517-522.

Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

Benninger-Truax, M., J.L. Vankat, and R.L. Schaefer. 1992. Trail corridors as habitat and conduits for movement of plant species in Rocky Mountain National Park, CO. Landscape Ecology 6(4):269-278.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Dale, D. and T. Weaver. 1974. Trampling effects on vegetation of the trail corridors of north Rocky Mountain forests. Journal of Applied Ecology 11:767-772.

DeLong, A.K. 2002. Managing visitor use and disturbance of waterbirds—a literature review of impacts and mitigation measures. Prepared for Stillwater National Wildlife Refuge. Appendix L in: Stillwater National Wildlife Refuge Complex Final Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision (Volume II). Department of the Interior, Fish and Wildlife Service, Region 1, Portland, Oregon. 114 pp. Available at: www.fws.gov/stillwater/litreview.

DeLuca, T.H., W.A. Patterson, W.A. Freimund, and D.N. Cole. 1998. Influence of llamas, horses, and hikers on soil erosion from established recreation trails in western Montana. USA Environmental Management 22(2):255-262.

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Hansen, M.J. and A.P. Clevenger. 2005. The influence of disturbance and habitat on the presence of nonnative plant species along transport corridors. Biological Conservation 125(2005):249-259.

Havera, S.P., L.R. Boens, M.M. Georgi, and R.T. Shealy. 1992. Human disturbance of waterfowl on Keokuk Pool, Mississippi River. Wildlife Society Bulletin 20(3):290-298.

Kahl, R. 1991. Boating disturbance of canvasbacks during migration at Lake Poygan, Wisconsin. Wildlife Society Bulletin 19(3):242-248.

Kenow, K.P., C.E. Korschgen, J.M. Nissen, A. Elfessi, and R. Steinbach. 2003. A voluntary program to curtail boat disturbance to waterfowl during migration. Waterbirds 26(1):77-87.

Kight, C.R. and J.P. Swaddle. 2007. Associations of anthropogenic activity and disturbance with fitness metrics of eastern bluebirds (*Sialia sialis*). Biological Conservation 138(1-2):189-197.

Knapton, R.W., S.A. Petrie, and G. Herring. 2000. Human disturbance of diving ducks on Long Point Bay, Lake Erie. Wildlife Society Bulletin 28(4):923-930.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Korschgen, C.E. and R.B. Dahlgren. 1992. Human disturbances of waterfowl: causes, effects, and management. Waterfowl Management Handbook. Fish and Wildlife Leaflet 13.2.15. U.S. Fish and Wildlife Service. 8 pp.

Liddle, M.J. 1975. A selective review of the ecological effects of human trampling on natural ecosystems. Biological Conservation 7:17-36.

Madsen, J. 1995. Impacts of disturbance on migratory waterfowl. Ibis 137:S67-S74.

Miller, J.R. and N.T. Hobbs. 2000. Recreational trails, human activity, and nest predation in lowland riparian areas. Landscape and Urban Planning 50(4):227-236.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8(1):162-169.

Morton, J.M., A.C. Fowler, and R.L. Kirkpatrick. 1989. Time and energy budgets of American black ducks in winter. Journal of Wildlife Management 53:401-410.

Oberbillig, D.R. 2000. Providing positive wildlife viewing experiences. Deborah Richie Communications. Missoula, MT.

Owens, N.W. 1977. Responses of wintering brant geese to human disturbance. Wildfowl 28:5-14.

Raveling, D.G. 1979. The annual cycle of body composition of Canada geese with special reference to control of reproduction. Auk 96:234-252.

USFWS and U.S. Census Bureau. 2007. 2006 national survey of fishing, hunting and wildlife-associated recreation. Available at: http://www.census.gov/prod/2008pubs/fhw06-nat.pdf. Accessed May 18, 2012.

White-Robinson, R. 1982. Inland and salt marsh feeding of wintering brent geese in Essex. Wildfowl 33:113-118.

Whittaker, P.L. 1978. Comparison of surface impact by hiking and horseback riding in the Great Smoky Mountain National Park. Management Report 24. U.S. Department of the Interior, National Park Service. 80 pp.

Compatibility Determination for Hunting Waterfowl and Upland Birds (B.6)

Use is compatible with stipulations.

Prepared by:	_____	_____
	(Signature)	(Date)
Refuge Manager/ Project Leader Approval:	_____	_____
	(Signature)	(Date)

Concurrence:

Refuge Supervisor:	_____	_____
	(Signature)	(Date)
Regional Chief, National Wildlife Refuge System:	_____	_____
	(Signature)	(Date)

B.7 Compatibility Determination for Recreational Boating

RMIS Database Use: Non-competitive recreational boating (motorized, human powered, electric, and wind-driven)

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

This CD addresses the subject uses for the Lake Lowell Unit of the Refuge. The Service's jurisdiction over surface water uses on the Snake River Islands Unit is limited to areas above mean high water. Since there are no navigable areas above mean high water, recreational boating is not allowed on the Snake River Islands Unit.

Types of Boating

Recreational boating addressed in this CD includes use of motorized (jetboats, outboard and inboard motorboats, personal watercraft), human-powered (kayaks, canoes, paddleboards, rowboats, float-tubes), and electric/wind-driven (boats powered by trolling motors, sailboats, windsurfing boards, and kiteboards) craft on all waters of the Lake Lowell Unit. Tow-behind activities (e.g., waterskiing, wake boarding) are allowed in areas open to wake (see below) activities.

Boating itself is not considered a wildlife-dependent public use. However, it occurs as an integral part of wildlife-dependent public uses such as hunting, fishing, wildlife observation, and photography.

Current Location of Use

Boating producing a wake is allowable anywhere in the lake during the summer season (see below). Only no-wake boating may occur in the zone east from the line between Parking Lot 1 and the shore to the northeast. No boats are allowed in a closed area around the osprey nesting platform south of the Visitor Center.

Associated Facilities

There are five boat launches, consisting of the launches at Upper Dam East, Upper Dam West, Lower Dam Recreation Area, and Parking Lots 1 and 7. Individuals can also launch human-powered boats from a variety of formal and informal locations along the shore.

Number of Visitors and Seasonal Patterns

In it is estimated that there were 76,400 nonwildlife-dependent recreational boating visits to Lake Lowell in FY 2011 with a majority of these being motorized boats. In FY 2011, approximately 35 percent of the boaters were anglers, and the rest were participating in other recreational activities.

Boating is allowed on the Refuge between April 15 and September 30, during daylight hours only. Lake Lowell is closed to recreational boating during the winter waterfowl season to provide refuge to migrating waterfowl in closed areas and high-quality hunts in open areas. Motorized boat use peaks in July before tapering off in the fall. Declining water levels often require closure of the Upper Dam West and Lower Dam Recreation Area boat launches in July or August. The water quality of the lake is also a concern to recreationists and partially accounts for falling use in August and September, since green and potentially toxic blue-green algae blooms are frequent in the late summer and early fall.

Proposed Uses

Under the Preferred Alternative 2, the Refuge would continue to provide recreational boating opportunities with an emphasis on supporting wildlife-dependent priority public uses. Boating would be allowed as follows (see Map 5):

- The no-wake zone on the east end of the lake would be expanded to go east from a line between Parking Lot 1 and Gotts Point rather than east from a line between Parking Lot 1 and the shore to the northeast.
- To protect emergent beds for nesting grebes and other wildlife, institute the following no-wake zones or closures:
    - Protect emergent plant beds on south side of the lake with a 200-yard no-wake zone measured from the edge of the shoreline or emergent vegetation, whichever is closest to the center of the lake.
    - No-wake area in Narrows between East Pool and West Pool (see Map 5).
    - Protect all active and historical grebe nesting colonies by establishing a 500-yard area not open to public use during boating season (Berg et al. 2004). If there is no nesting in a colony by July 15 of the following year, the closure around that colony would be reopened. Upland portions of the closures would be open to use from October 1 through January 31.
- The following seasonal closures would be implemented at the Lake Lowell Unit as necessary to protect sensitive wildlife habitat:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Winter waterfowl closure at Gotts Point from October 1 through January 31.
    - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
    - Up to 100-yard closure around shorebird feeding areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
- To protect mudflat habitat and migrating shorebirds, institute the following closures.
    - Shorebird area at northern shoreline of the East Pool east of Tio Lane access (see Map 5) would be open to boating April 15 through July 14 and closed seasonally (July 15 through September 30) when water level falls below 2,522 feet in elevation.
- Tow-behind activities (e.g., waterskiing, wake boarding) would be allowed in areas open to wake activities.
- Kiteboarders and windsurfers would be allowed to launch from any open shoreline but must comply with speed limits in no-wake zones. Wind sport enthusiasts would be allowed to launch from any open shoreline but must comply with speed limits in no-wake zones.
- A kayak/canoe launch at Gotts Point would be provided for access to prime wildlife-observation areas.

Availability of Resources

Deer Flat NWR is open to a variety of recreational boating opportunities under the Preferred Alternative. Most of the costs associated with carrying out the improvements described in the Preferred Alternative are one-time expenses (see Table B-6). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Currently, most on-water law enforcement and boating-related dock maintenance is provided by the Canyon County Sheriff's Office. If the Sheriff's Office ever decided to discontinue this assistance, there would be additional costs associated with maintaining this use. Because the Sheriff's Office is not currently able to provide law enforcement for Refuge-specific regulations, it will be important for the Refuge to increase its law enforcement presence and/or work with Canyon County to enable County deputies to enforce these regulations.

Funding would be sought through the Service budget process. Other sources would be sought through strengthened partnerships, grants, coordination with other law enforcement agencies, and additional Refuge operations funding to support a safe, quality public use program. Increased volunteer assistance, strengthened existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. When provided the appropriate training, Refuge volunteers, interns, and various user groups can assist with monitoring, education and interpretation programs, and maintenance projects. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities using the same resource. For instance, rehabilitating the Lower Dam Recreation Area would benefit boaters but it would also benefit picnickers, swimmers, fisherman, and other visitors. This same cost has been shown in all CDs that may use the new Lower Dam Recreation Area.

Table B-6. Costs to Implement Improvements to the Recreational Boating Program

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Install new kiosks and signs at access points and maintain signs	$261,000	$2,700
*Visitor contact station	$480,000	$1,600
*Install and maintain comfort station and vault toilet at Lower Dam Recreation Area (LDRA) and Parking Lot 1	$208,200	$3,000
*Rehabilitate LDRA parking area	$50,000	
*LDRA site plan	$40,000	
*Print/reprint general Refuge brochures	$3,200	$800
*Seasonal nesting closure signs (Lake Lowell and Snake River Islands Units)	$11,000	$5,200
*Install and maintain buoys for seasonal closures and permanent no-wake areas	$4,300	$500
*Human/wildlife interaction disturbance studies	$140,000	
*Law enforcement officer		$62,400
Total	**$1,197,700**	**$76,200**

Anticipated Impacts of Use

The discussion below analyzes impacts of the use as proposed under Preferred Alternative 2.

The Lake Lowell Unit of Deer Flat National Wildlife Refuge provides valuable nesting, foraging, and resting habitat for migratory birds, including wintering waterfowl, shorebirds, secretive marsh birds, and other waterbirds. The lake is open to recreational use during critical nesting times for a variety of avian species.

General Impacts to Wildlife

Disturbance Effects: Both motorized and nonmotorized boating have been shown to change wildlife distribution and use of particular habitats, alter feeding behavior and nutritional status, and cause premature departure from desirable habitat (Bouffard 1982; Kaiser and Fritzell 1984; Korschgen et al. 1985). Studies have also shown that boating disturbance may cause increased flight time and flushing distances in waterfowl species (Havera et al. 1992; Kahl 1991; Kenow et al. 2003; Knapton et al. 2000). Wildlife species that are more sensitive to recreation-related disturbances (e.g., bald eagles, shorebirds, grebes) may find it increasingly difficult to secure adequate food or loafing sites as their preferred habitat becomes fragmented by disturbance (Burger 1997; Pfister et al. 1992; Skagen et al. 1991).

Motorized boats can cover a larger area in a relatively short time in comparison to nonmotorized boats, affecting a greater area and providing less time for wildlife to react. Compared to motorboats, human-powered boats like canoes and kayaks appear to cause fewer disturbances to most wildlife species (Huffman 1999). However, canoes and kayaks can cause measurable disturbance effects because they can access shallower and more densely vegetated areas of a marsh (Speight 1973). Slow-moving boats in close proximity to nesting great blue herons can cause temporary nest abandonment (Vos et al. 1985), and Huffman (1999) found that nonmotorized boats within 30 meters (98 feet) of the shoreline in south San Diego Bay caused all wintering waterfowl to flush between the craft and shore. There have been several studies documenting impacts to birds native to Deer Flat NWR. One study showed a decrease in use of a bald eagle feeding site when human activity (including motorized boating) occurred within 200 meters (Skagen 1980). Another disturbance study showed that motorboats were more likely to elicit responses in wintering bald eagles than nearby automatic weapons fire, small arms fire, ordnance impacts, and helicopter flights associated with a military installation (Stalmaster and Kaiser 1997). Rodgers and Schwikert (2002) measured flushing distances from motorized watercraft for 23 waterbird species, of which the great blue heron was one of the more sensitive, flushing between distances of 8 and 137 meters.

Effects to Water Quality

In addition to noise and speed, motorized boats pollute waters with gas and oil. Older two-stroke engines, in which the gas and oil are combined, can discharge as much as 25 percent of the unspent mixture gas directly into the water. Hydrocarbons in gas and oil float on the surface of the water and bioaccumulate in the food web, posing a threat to sensitive shallow lacustrine habitats (Tjarnlund et al. 1995). Hoffman (1998) reviewed several studies, concluding that petroleum hydrocarbons can also be transferred to eggs from the plumage of incubating birds and can be toxic even in small amounts.

There is a possibility of boats aiding in the spread of aquatic invasive species into the waters of the Refuge. Informational media in hunting brochures, placards at launch sites (including Refuge launches), registration requirements, systematic and periodic inspections, and early detection monitoring help reduce the likelihood of infestation. The Idaho State Department of Agriculture is at the forefront of preventing the spread of aquatic invasive species into the waters of Idaho and works in concert with various agencies including the Service.

Refuge-specific Impacts

This section evaluates the likely impact at the Refuge, considering the scientific studies discussed above and considering the uses within the context of Deer Flat Refuge.

Loss of Habitat from Facility Construction: In the Preferred Alternative, the addition of three fishing docks and one shorebird viewing blind is expected to affect approximately 5 acres or less of open water habitat.

Vegetation, Soil, and Water Impacts: As described above, the potential for water quality impacts and contaminants in the food web stemming from the release of gas and oil hydrocarbons into Refuge waters would continue to exist. The Refuge would promote the use of CARB star-rated motors at the level of two stars and above to reduce impacts from petroleum hydrocarbons. A total maximum daily load (TMDL) assessment for the Lake Lowell watershed was prepared by the Idaho Department of Environmental Quality (IDEQ) that explored water quality concerns in Lake Lowell. Petroleum hydrocarbon pollution from boats was not explored in the TMDL because the focus was on pollution loads associated with agriculture runoff and other nonpoint sources. Even though oil and grease are listed as pollutants of concern in the Boise River (Lower) Subbasin Hydrologic Subunit, dissolved oxygen, sediment, and nutrients are the focus of the TMDL, because the presence of these pollutants at current levels likely render hydrocarbon levels insignificant (IDEQ 2010).

Disturbance Effects to Wintering and Migrating Wildlife: The wintertime closure is expected to adequately protect wintering and migrating birds using Lake Lowell. It is critical for waterfowl to conserve energy during migration and the cold winter months. Closed areas provide unmolested space for birds as they are resting and refueling for the journey ahead of them.

Disturbance Effects to Colonial-nesting Birds: Colonial-nesting birds at Lake Lowell may be among the most sensitive species subjected to potential disturbance from boating. Lake Lowell is one of only three lakes in Idaho that routinely hosts colonies of nesting western and Clark's grebes, whose breeding population is considered imperiled in the state (IDFG 2005). Idaho Fish and Game has printed pamphlets for public distribution that provide information on conflicts between boaters and grebes and the importance of responsible boating. High-speed boating displaces grebes from preferred habitats, disrupts nesting and feeding, and even causes loss of young (Burger 1997). Grebe adults and chicks are often killed by boats (Ivey 2004; Shaw 1998), and small chicks can become separated from their parents and die of exposure if adults have to dive to avoid motorboats (Storer and Nuechterlein 1992).

Disturbance Effects to Other Species: The Lake Lowell Unit includes riparian forest, emergent vegetation, and open water habitats that are used extensively by a variety of bird species. The disturbance effects to wildlife described in the General Impacts section above applies to the anticipated effects to wildlife on Deer Flat NWR. It is anticipated that wildlife species using the open water and emergent plant habitats of the Refuge would benefit from the reduced disturbances that restricted use areas would provide.

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is

currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from boating would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Impacts to Priority Public Uses

Boating, whether motor-, wind-, or human-powered, may provide additional wildlife-dependent recreational opportunities by opening up areas of the Refuge inaccessible to foot traffic. However, as described above, given the tendency of birds to flush when subjected to a high intensity of disturbance, wildlife viewing opportunities would be expected to be poor in wake zones between April and September.

The majority of habitats used by priority species on the Refuge can be protected from undue impacts by separating boat use from wildlife use in time and space. During winter, nearly the entire lake would be protected from motorized boating use, providing protection during this season. During the breeding season, an adequate amount of habitat would be available to the majority of waterfowl and other wetland birds because nesting areas for the most sensitive wildlife species would be closed to boating; some additional areas used for nesting, feeding, and resting would be encompassed in no-wake zones. The Stipulations section below also provides parameters under which this use can be allowed in order to ensure compatibility.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register.
- Distributed approximately 1,300 copies of Planning Update 1.
- Provided informational presentations to 26 local organizations.
- Held evening call-in hours the second and fourth Wednesdays of the month.
- Held open houses July 28, August 20, and August 21.
- Contacted visitors over eight days in July and August and handed out over 700 flyers.
- Over 1,000 comments were received.

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list.
- Provided informational presentations to 28 local organizations.
- Held open houses on June 3, June 4, July 8, and July 9.
- Attended local festivals.
- Almost 350 comments were received.

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
___X___ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- Boaters must abide by all applicable Refuge, U.S. Coast Guard, and State of Idaho laws.
- Boaters would not be allowed to anchor or pull onto land adjacent to closed areas.
- No competitive activities are allowed, with the exception of sailing regattas (see Sailing Regattas CD).
- To minimize disturbance to shoreline vegetation and on-water nesting species, no internal or external wake generating devices (e.g., ballasts) would be allowed on motorized boats.
- Boats that are specifically designed to operate in mud or emergent vegetation, using above-water propulsion devices (e.g., boats equipped with “mud motors” or air boats) are not permitted on the Refuge.
- To reduce the likelihood of introducing invasive species, the use of internal or external ballasts would not be allowed.
- To minimize noise disturbance to wildlife, Idaho State noise ordinances would be enforced on Lake Lowell.
- Promote the use of CARB star-rated motors at the level of two stars and above.
- Use would be restricted to daylight hours only.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
        - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points

would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure will be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.

  - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
  - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
- No-wake zones would be implemented as follows to protect sensitive wildlife habitat and provide no-wake recreational opportunities:
  - Protect emergent plant beds on south side of the lake with a 200-yard no-wake zone measured from the edge of the shoreline or emergent vegetation, whichever is closest to the center of the lake.
  - Establish no-wake area in the Narrows between the East and West Pools.
  - Establish no-wake zone east from line between Parking Lot 1 and Gotts Point.
- Wind sport enthusiasts would be allowed to launch from any open shoreline but must comply with speed limit in no-wake zones.
- Refuge staff would monitor impacts of boating activities annually to assess compliance with these stipulations, impacts to waterfowl, shorebirds, waterbirds (especially *Aechmophorus* grebes), and other migratory birds as well as wildlife habitat, and conflicts between user groups. Monitoring data would be used to modify these stipulations if necessary to ensure continued compatibility of these activities.

Justification

Providing opportunities for priority wildlife-dependent recreational activities is in keeping with provisions under the National Wildlife Refuge System Administration Act of 1966 as amended. Although boating itself is not a wildlife-dependent recreational activity, wildlife-dependent activities like fishing and wildlife observation may be enhanced with boating.

A significant proportion of Lake Lowell Unit visitors are boaters. Educational programs targeting boaters on Lake Lowell are expected to help reduce the negative impacts associated with boating activities. Nonwildlife-dependent boating visitors provide the opportunity for the Refuge to reach out to nontraditional Refuge user groups and to encourage boating users to observe wildlife and to learn about the National Wildlife Refuge System. Due to the close proximity of Deer Flat NWR to the cities of Nampa and Caldwell, the number and variety of users to this urban refuge is expected to grow. For many people, boating at Lake Lowell may provide an introduction to a national wildlife refuge.

Although motorized boating has been documented to impact wildlife and the habitats on which they rely, implementing the stipulations described above would reduce these impacts. It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge would not be measurably lessened from allowing boating to occur on the Refuge. With the proposed protections in place, number of individuals expected to be adversely affected due to boating would not cause wildlife populations to materially decline, the physiological

condition and production of wildlife species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing boating to occur with stipulations would not materially detract or interfere with the purposes for which the Refuge was established or the Refuge System mission.

Mandatory Reevaluation Date

__2024__ Mandatory 10-year Reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

References

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Bouffard, S.H. 1982. Wildlife values versus human recreation: Ruby Lake National Wildlife Refuge. Transactions of the North American Wildlife and Natural Resources Conference 47:553-558.

Burger, A.E. 1997. Status of the western grebe in British Columbia. Wildlife Working Report WR-87. B.C. Ministry of Environment, Lands, and Parks. Victoria, British Columbia. 40 pp.

DeLong, A.K. 2002. Managing visitor use and disturbance of waterbirds—a literature review of impacts and mitigation measures. Prepared for Stillwater National Wildlife Refuge. Appendix L in: Stillwater National Wildlife Refuge Complex Final Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision (Volume II). Department of the Interior, Fish and Wildlife Service, Region 1, Portland, Oregon. 114 pp. Available at: www.fws.gov/stillwater/litreview.

Havera, S.P., L.R. Boens, M.M. Georgi, and R.T. Shealy. 1992. Human disturbance of waterfowl on Keokuk Pool, Mississippi River. Wildlife Society Bulletin 20(3):290-298.

Hoffman, D.J. 1989. Embryotoxicity and teratogenicity of environmental contaminants to bird eggs. Reviews of Environmental Contamination and Toxicology 115:41-50.

Huffman, K. 1999. San Diego South Bay survey report—effects of human activity and water craft on wintering birds in South San Diego Bay. USFWS.

IDEQ. 2010. Lake Lowell TMDL: addendum to the lower Boise River subbasin assessment and total maximum daily loads. IDEQ Boise Regional Office. Boise, ID. 247 pp. Available at: http://www.deq.idaho.gov/media/451719-_water_data_reports_surface_water_tmdls_boise_river_lower_lake_lowell_addendum.pdf. Accessed June 11, 2012.

IDFG (Idaho Department of Fish and Game). 2005. Idaho comprehensive wildlife conservation strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. Available at: http://fishandgame.idaho.gov/public/wildlife/cwcs/. Accessed May 18, 2012.

Ivey, G.L. 2004. Conservation assessment and management plan for breeding western and Clark's grebes in California. Prepared for American Trader Trustee Council: an interagency group comprised of representatives from the California Department of Fish And Game, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service. Corvallis, Oregon.

Kahl, R. 1991. Boating disturbance of canvasbacks during migration at Lake Poygan, Wisconsin. Wildlife Society Bulletin 19(3):242-248.

Kaiser, M. and E. Fritzell. 1984. Effects of river recreationists on green-backed heron behavior. Journal of Wildlife Management 48(2):561-567.

Kenow, K.P., C.E. Korschgen, J.M. Nissen, A. Elfessi, and R. Steinbach. 2003. A voluntary program to curtail boat disturbance to waterfowl during migration. Waterbirds 26(1):77-87.

Knapton, R.W., S.A. Petrie, and G. Herring. 2000. Human disturbance of diving ducks on Long Point Bay, Lake Erie. Wildlife Society Bulletin 28(4):923-930.

Korschgen, C., L. George, and W. Green. 1985. Disturbance of diving ducks by boaters on a migrational staging area. Wildlife Society Bulletin 13:290-296.

Pfister, C., B.A. Harrington, and M. Lavine. 1992. The impact of human disturbance on shorebirds at a migration staging area. Biological Conservation 60:115-126.

Rodgers, J.A., Jr. and S.T. Schwikert. 2002. Buffer-zone distances to protect foraging and loafing waterbirds from disturbance by personal watercraft and outboard-powered boats. Conservation Biology 16(1):216-224.

Shaw, D.W.H. 1998. Changes in population size and colony location of breeding waterbirds at Eagle Lake, California between 1970 and 1997. Thesis. California State University, Chico.

Skagen, S.K. 1980. Behavioral responses of wintering bald eagles to human activity on the Skagit River, Washington. Pages 231-241 in: R.L. Knight, G.T. Allen, M.V. Stalmaster, and C.W. Servheen eds. Proceedings of the Washington Bald Eagle Symposium. The Nature Conservancy. Seattle, WA.

Skagen, S.K., R.L. Knight, and G.H. Orians. 1991. Human disturbances of an avian scavenging guild. Ecological Applications 1:215-225.

Speight, M.C.D. 1973. Outdoor recreation and its ecological effects: a bibliography and review. Discussion Papers in Conservation 4. University College London, England. 35 pp.

Stalmaster, M.V. and J.L. Kaiser. 1997. Flushing responses of wintering bald eagles to military activity. Journal of Wildlife Management 61(4):1307-1313.

Storer, R.W. and G.L. Nuechterlein. 1992. Western grebe (*Aechmorphorus occidentalis*) and Clark's grebe (*Aechmorphorus clarkia*). In: A. Poole and F. Gill eds. Birds of North America, No. 26. Philadelphia, PA., Academy of Natural Sciences and American Ornithologists' Union. 24 pp.

Tjarnlund, U., G. Ericson, E. Landesjoo, I. Petterson, and L. Balk. 1995. Investigation of the biological effects of two-cycle outboard engines' exhaust on fish. Marine Environmental Research 39:313-316.

Vos, D.K., R.A. Ryder, and W.D. Graul. 1985. Response of breeding great blue herons to human disturbance in northcentral Colorado. Colonial Waterbirds 8:13-22.

Compatibility Determination for Recreational Boating (B.7)

Use is compatible with stipulations.

Prepared by:	_____	_____
	(Signature)	(Date)
Refuge Manager/ Project Leader Approval:	_____	_____
	(Signature)	(Date)

Concurrence:

Refuge Supervisor:	_____	_____
	(Signature)	(Date)
Regional Chief, National Wildlife Refuge System:	_____	_____
	(Signature)	(Date)

B.8 Compatibility Determination for Research

RMIS Database Use: Research

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

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- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

The Refuge staff receives periodic requests from non-Service entities (e.g., universities, State or Territorial agencies, other Federal agencies, nongovernmental organizations) to conduct research, scientific collecting, and surveys on Refuge lands. These project requests can involve a wide range of natural and cultural resources as well as public-use management issues including basic absence/presence surveys, collection of new species for identification, habitat use and life-history requirements for specific species/species groups, practical methods for habitat restoration, extent and severity of environmental contaminants, techniques to control or eradicate pest species, effects of climate change on environmental conditions and associated habitat/wildlife response, identification and analyses of paleontological specimens, wilderness character, modeling of wildlife populations, bioprospecting, and assessing response of habitat/wildlife to disturbance from public uses. Projects may be species-specific or Refuge-specific, or they may evaluate the relative contribution of the Refuge lands to larger landscapes (e.g., ecoregion, region, flyway, national, international), issues, and trends.

The Service's Research and Management Studies (4 RM 6) and Appropriate Refuge Uses (603 FW 1.10D(4)) policies indicate priority for scientific investigatory studies that contribute to the enhancement, protection, use, preservation, and management of native wildlife populations and their habitat as well as their natural diversity. Projects that contribute to Refuge-specific needs for resource and/or wilderness management goals and objectives, where applicable, would be given a higher priority over other requests.

Availability of Resources

Refuge staff responsibilities for projects by non-Service entities would be primarily be limited to the following: review of proposals, prepare SUPs and other compliance documents (e.g., for Section 7 of the Endangered Species Act of 1973, Section 106 of the National Historic Preservation Act), and monitor project implementation to ensure that impacts and conflicts remain within acceptable levels (compatibility) over time. Additional administrative, logistical, and operational support may also be provided depending on each specific request. Estimated costs for one-time (e.g., prepare a SUP) and annually reoccurring tasks by Refuge staff and other Service employees would be determined for each project. Sufficient funding in the general operating budget of the Refuge must be available to cover expenses for these projects. In cases where the Refuge staff is asked to act as a cooperator on research projects, funding may be cost-shared or specially designated funds may be used for the operation and administration of the projects. The terms and conditions for funding and staff support necessary to administer each project on the Refuge would be clearly stated in every SUP.

The Refuge has the following staffing and funding to administratively support and monitor research that is currently taking place on Refuge lands (see Table B-7). Any substantial increase in the number of projects would create a need for additional resources to oversee the administration and monitoring of the investigators and their projects. Any substantial additional costs above those itemized below may result in finding a project not compatible unless expenses are offset by the investigator(s), sponsoring agency, or organization.

New costs associated with carrying out the enhanced research, inventory, and assessment programs includes annual costs to hire a biological technician to carry out Refuge projects, and one-time costs that would be provided to contractors tasked with specific projects. New research, inventory, and assessment needs as described in the Preferred Alternative are listed in Table B-7. Because the

Service has limited capacity to fund new positions and projects, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities that would be affected by the research. For instance, studies that determine the quality of wildlife-dependent recreation opportunities would help the Refuge better manage these uses and improve programs. Therefore, the cost would also be reflected in the CDs for each of the wildlife-dependent uses.

Table B-7. Costs to Implement Enhanced Research, Inventory, and Assessment Projects

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
Hire biological technician, who would conduct: • breeding and migratory bird inventories of shrub steppe and riparian habitats • inventory of wildlife use of wetlands • early detection of and rapid response to new/spreading invasive plants/animals • collecting baseline habitat and wildlife information • waterfowl, shorebird, ground-nesting birds, passerines, and grebe surveys, Biological technician would assist with the following research, monitoring, and information assessment projects: • human/wildlife interaction disturbance studies o prioritization of Refuge islands for wildlife value • analyzing historic biological data to assess long-term population trends • contaminants studies • mule deer studies • cheatgrass removal studies • surveys of wetland topography • soil surveys of shrub steppe and creation of GIS mapping layers		$51,000
*Disturbance studies		
Prioritization of Refuge islands		
Analysis of historical biological data		
Contaminants studies	$450,000	
Mule deer studies		
Cheatgrass removal studies		
Wetland topography surveys		
Soil surveys of shrub-steppe and creation of GIS mapping layers		
*Quality of wildlife-dependent public use programs	$75,000-$80,000	
Total	**$525,000-$530,000**	**$51,000**

Anticipated Impacts of the Use

Use of the Refuge to conduct research, scientific collecting, and surveys would generally provide information that would benefit fish, wildlife, plants, and their habitats. Scientific findings gained through these projects provide important information regarding life-history needs of species and

species groups as well as identify or refine management actions to achieve resource management objectives in refuge management plans (especially CCPs). Reducing uncertainty regarding wildlife and habitat responses to refuge management actions in order to achieve desired outcomes reflected in resource management objectives is essential for adaptive management in accordance with 522 DM 1.

If a research project's methods impact or conflict with Refuge-specific resources, priority wildlife-dependent public uses, other high-priority research, wilderness, or Refuge habitat and wildlife management programs, then it must be clearly demonstrated that the project's scientific findings would contribute to resource management and that the project cannot be conducted off of Refuge lands for the project to be compatible. The investigator(s) must identify in advance methods/ strategies required to minimize or eliminate the potential impact(s) and conflict(s). If unacceptable impacts cannot be avoided, then the project would not be compatible. Projects that represent public or private economic use of the natural resources of any national wildlife refuge (e.g., bioprospecting), in accordance with 16 U.S.C. 715s, must contribute to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission to be compatible (50 C.F.R. 29.1).

Impacts would be project- and site-specific, where they would vary depending upon nature and scope of the fieldwork. Data collection techniques would generally have minimal animal mortality or disturbance, habitat destruction, no introduction of contaminants, or no introduction of nonindigenous species. In contrast, projects involving the collection of biotic samples (plants or animals) or requiring intensive ground-based data or sample collection would have short-term impacts. To reduce impacts, the minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, and vertebrates) would be collected for identification and/or experimentation and statistical analysis. Where possible, researchers would coordinate and share collections to reduce sampling needed for multiple projects. For example, if one investigator collects fish for a diet study and another research examines otoliths, then it may be possible to accomplish sampling for both projects with one collection effort.

Investigator(s) obtaining required State and Federal collecting permits would also ensure minimal impacts to fish, wildlife, plants, and their habitats. If after incorporating the above strategies a project would still result in long-term or cumulative effects, the project would not be considered compatible. A Section 7 consultation under the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884, as amended, Public Law 93-205) would be required for activities that may affect a federally listed species and/or critical habitat. Only projects that have no effect or would result in not likely to adversely affect determinations would be considered compatible.

Spread of invasive plants and/or pathogens is possible from ground disturbance and/or transportation of project equipment and personnel, but it would be minimized or eliminated by requiring proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary. If after all practical measures are taken and unacceptable spread of invasive species is anticipated to occur, then the project would be found not compatible without a restoration or mitigation plan.

There also could be localized and temporary effects from vegetation trampling, collecting of soil and plant samples, or trapping and handling of wildlife. Impacts may also occur from infrastructure necessary to support a projects (e.g., permanent transects or plot markers, exclosure devices, monitoring equipment, solar panels to power unattended monitoring equipment). Some level of disturbance is expected with these projects, especially if investigator(s) enter areas closed to the public and collect samples or handle wildlife. However, wildlife disturbance (including altered

behavior) would usually be localized and temporary in nature. When long-term or cumulative unacceptable effects cannot be avoided, the project would not be found compatible.

At least six months before initiation of fieldwork (unless an exception is made by prior approval of the Refuge Manager), project investigator(s) must submit a detailed proposal using a format provided by the Refuge. Project proposals would be reviewed by Refuge staff and others, as needed, to assess the potential impacts (short-term, long-term, and cumulative) relative to benefits of the investigation to Refuge management issues and understanding of natural systems. This assessment would form the primary basis for allowing or denying a specific project. Projects that result in unacceptable Refuge impacts would not be found compatible. If allowed and found compatible after approval, all projects also would be assessed during implementation to ensure impacts and conflicts remain within acceptable levels.

If the proposal is approved, then the Refuge Manager would issue a SUP with required stipulations (terms and conditions) of the project to avoid and/or minimize potential impacts to Refuge resources as well as conflicts with other public-use activities and Refuge field management operations. After approval, projects also are monitored during implementation to ensure impacts and conflicts remain within acceptable levels based upon documented stipulations.

The combination of stipulations identified above and conditions included in any SUP would ensure that proposed projects contribute to the enhancement, protection, conservation, and management of native wildlife populations and their habitats on the Refuge. As a result, these projects would help fulfill the Refuge's purposes; contribute to the mission of the NWRS; and maintain the biological integrity, diversity, and environmental health of the Refuge.

Projects that are not covered by the CCP (objectives under Goal 6, Gather sufficient scientific information to guide responsible adaptive management decisions for the Refuge's trust resources) would require additional NEPA documentation.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register.
- Distributed approximately 1,300 copies of Planning Update #1.
- Provided informational presentations to 26 local organizations.
- Held evening call-in hours the second and fourth Wednesdays of the month.
- Held open houses July 28, August 20, and August 21.
- Contacted visitors over eight days in July and August and handed out over 700 flyers.
- Over 1,000 comments were received.

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list.
- Provided informational presentations to 28 local organizations.
- Held open houses on June 3, June 4, July 8, and July 9.
- Attended local festivals.
- Almost 350 comments were received.

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
____X____ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

Each project would require a SUP. Annual or other short-term SUPs are preferred; however, some permits would be a longer period, if needed, to allow completion of the project. All SUPs would have a definite termination date in accordance with 5 RM 17.11. Renewals would be subject to the Refuge Manager's review and approval based timely submission of and content in progress reports, compliance with SUP stipulations, and required permits.

- Projects would adhere to scientifically defensible protocols for data collection, where available and applicable.
- Investigators must possess appropriate and comply with conditions of State and Federal permits for their projects.
- If unacceptable impacts to natural resources or conflicts arise or are documented by the Refuge staff, then the Refuge Manager can suspend, modify conditions of, or terminate an ongoing project already permitted by SUP on the Refuge.
- Progress reports are required at least annually for multiple-year projects. The minimum required elements for a progress report would be provided to investigator(s).
- Final reports are due one year after completion of the project unless negotiated otherwise with the Refuge Manager.
- Continuation of existing projects would require approval by the Refuge Manager.
- The Refuge staff would be given the opportunity to review draft manuscript(s) from the project before manuscripts are submitted to a scientific journal(s) for consideration of publication.
- The Refuge staff would be provided with copies (reprints) of all publications resulting from a Refuge project.
- The Refuge staff would be provided with copies of raw data (preferably electronic database format) at the conclusion of the project.
- Upon completion of the project or annually, all equipment and markers (unless required for long-term projects), must be removed and sites must restored to the Refuge Manager's

satisfaction. Conditions for clean-up and removal of equipment and physical markers would be stipulated in the SUP.

- All samples collected on Refuge lands are the property of the Service even while in the possession of the investigator(s). Any future work with previously collected samples not clearly identified in the project proposal would require submission of a subsequent proposal for review and approval. In addition, a new SUP would be required for additional project work. For samples or specimens to be stored at other facilities (e.g., museums), a memorandum of understanding would be necessary.
- Sampling equipment as well as investigator clothing and vehicles (e.g., all-terrain vehicles, boats) would be thoroughly cleaned (free of dirt and plant material) before being allowed for use Refuge lands to prevent the introduction and/or spread of pests. Where necessary, quarantine methods would be used.
- The NWRS, Deer Flat Refuge, Refuge staff and other Service personnel that supported or contributed to the project would be appropriately cited and acknowledged in all written and oral presentations resulting from projects on Refuge lands.
- At any time, Refuge staff may accompany investigator(s) in the field.
- Any proposed project in wilderness areas must comply with provisions of an existing minimum requirements analysis (MRA). Investigators not acting as agents of Service and requesting to conduct projects in wilderness must prepare an MRA consistent with Service Policy and adhere to the requirements of the Wilderness Act of 1964 (16 U.S.C. 1131-1136).
- Investigator(s) and support staff would follow all Refuge-specific regulations that specify access and travel on the Refuge.

Justification

Research, scientific collecting, and surveys on Refuge lands are inherently valuable to the Service because they expand scientific information available for resource management decisions. In addition, only projects that directly or indirectly contribute to the enhancement, protection, use, preservation, and management of Refuge wildlife populations and their habitats generally would be authorized on Refuge lands. In many cases, if it were not for the Refuge staff providing access to Refuge lands and waters along with some support, the project would never occur and less scientific information would be available to the Service to aid in managing and conserving the Refuge resources. By allowing the use to occur under the stipulations described above, it is anticipated that wildlife species that could be disturbed during the use would find sufficient food resources and resting places so their abundance and use would not be measurably lessened on the Refuge. Additionally, it is anticipated that monitoring, as needed, would prevent unacceptable or irreversible impacts to fish, wildlife, plants, and their habitats. As a result, these projects would not materially interfere with or detract from fulfilling the Refuge's purposes (including wilderness); contributing to the mission of the NWRS; and maintaining the biological integrity, diversity, and environmental health of the Refuge.

Mandatory reevaluation Date

__2024__ Mandatory 10-year Reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision: (check one below)

__X__ Environmental Impact Statement and Record of Decision

Compatibility Determination for Research (B.8)

Use is compatible with stipulations.

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager/
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge
Supervisor: _____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

B.9 Compatibility Determination for Sailing Regattas

RMIS Database Use: Sailing Regattas

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge (NWR or Refuge) was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (Executive Order [E.O.] 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

Sailing regattas currently take place in the center of the West Pool of the Lake Lowell Unit during the months of April and May. Sailing regattas occur by Special Use Permit on opposite weekends of bass tournaments. Southern Idaho Sailing Association is the only group actively sponsoring regattas at this time.

The race course is set the morning of the regatta by the race committee. On Saturday, at approximately 9:30 am, regatta participants meet at the Lower Dam Recreation Area to set up and launch their boats, parking them on the outside of the docks. A "skippers' meeting" is held adjacent to the docks at approximately 11:00 am, where boats are registered, safety is stressed and guests are paired up with boats for the day. Regatta participants then motor out to the start line in preparation for the 12:00 start of the first race. Each race starts approximately 15 minutes after the end of the last race. No races start after 4:00 pm. The first race starts at 10:00 am on Sunday with no race starting after 3:00 pm.

The race course is designated by three race buoys and a starting buoy. The starting line is designated by the area between the starting buoy and the race committee boat. The committee boat selects the course (or manner that the sailors would navigate the race buoys) and posts this selection on placards visible to the participants. Sailors begin at the starting line and then race to and around the race buoys according to the selected course. The starting line is also the finish line. At the end of the day's racing, participants return to the ramp and pull their boats out of the water.

These regattas are governed by the "International Sailing Federation rules" and boating rules set forth by the U.S. Coast Guard and the State of Idaho. The race committee normally requires all participants to wear personal flotation devices (PFDs) when whitecaps are present (wind approximately 10 knots). Races are postponed or abandoned by the race committee when winds are in excess of 20 knots (approximately 23 mph). Twenty or fewer boats have competed in all recent sailing regattas at Lake Lowell.

Proposed Use

Sailing regattas would take place in the West Pool of the Lake Lowell Unit with the issuance of a Special Use Permit. The regattas would be required to launch from the Lower Dam Recreation Area. The course would be set in water that is 15 feet in depth or greater.

To reduce impacts to wildlife-dependent users and other non-regatta Refuge users, regattas would launch from the Lower Dam Recreation Area. Twenty-five or fewer boats would be allowed at each regatta to provide adequate parking and dock space for other users. The first 60 feet on the inside of each dock at the Lower Dam Recreation Area must be available for non-regatta users at all times. Regatta participants may dock their boats on the rest of the dock during the morning briefing and retrieval of vessels at the end of the day.

Because large groups and high speeds impact wildlife more than individuals traveling at low speeds, sailing vessels that have a hull shape and/or sail configuration that would allow them to reach speeds greater than 20 mph for the wind conditions would not be allowed to compete in the regatta.

To decrease the exclusion of the general public to large areas of the Refuge that often occurs with competitive events, the course must remain open to other Refuge users during the racing activities.

Because most sailing vessels are large and highly visible, and the course has large amounts of open area, safety issues should not arise from the dual use of the race area. If the use of the racing area does create a safety issue in the future, this use would need to be reevaluated. The opportunity that is provided to the general public to be passengers on sailing vessels that are participating in sailing regattas is appreciated and encouraged.

All regattas must follow the International Sailing Federation rules, any boating rules set forth by the U.S. Coast Guard and the State of Idaho, as well as all Refuge rules and regulations. Races would be postponed or abandoned when winds are in excess of 20 knots (approximately 23 mph).

Availability of Resources

The following funding for annual costs would be required to administer and manage sailing regattas.

Because sailing regattas would use the same facilities as other on-water users and would need to have a full understanding of the no-wake zones, closure areas, and all other Refuge-specific regulations, the costs associated are very similar to those associated with all other recreational boating activities. Most of the costs associated with allowing sailing regattas are one-time expenses (see Table B-8). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Currently, most on-water law enforcement and boating-related dock maintenance is provided by the Canyon County Sheriff's Office. If the Sheriff's Office ever decided to discontinue this assistance, there would be additional costs associated with maintaining this use, and the ability of the Refuge to provide this use may be impaired. Because the Sheriff's Office is not currently able to provide law enforcement for Refuge-specific regulations, it will be important for the Refuge to increase its law enforcement presence and/or work with Canyon County to enable County deputies to enforce these regulations.

Funding would be sought through the Service budget process. Other sources would be sought through strengthened partnerships, grants, coordination with other law enforcement agencies, and additional Refuge operations funding to support a safe, quality public use program. Increased volunteer assistance, strengthened existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. When provided appropriate training, Refuge volunteers, interns, and various user groups can assist with monitoring, education and interpretation programs, and maintenance projects. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities using the same resource. For instance, rehabilitating the Lower Dam Recreation Area would benefit boaters but it would also benefit picnickers, swimmers, fisherman, and other visitors. This same cost has been shown in all CDs that may use the new Lower Dam Recreation Area.

Table B-8. Costs to Implement Improvements to the Recreational Boating Program

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Install new kiosks and signs at access points and maintain signs	$60,000	$100
*Visitor contact station	$480,000	$1,600
*Install and maintain comfort station and vault toilet at Lower Dam Recreation Area (LDRA) and Parking Lot 1	$208,200	$3,000
Rehabilitate LDRA parking area	$50,000	
*LDRA site plan	$40,000	
*Print/reprint general Refuge brochures	$3,200	$800
*Seasonal nesting closure signs (Lake Lowell and Snake River Islands Units)	$11,000	$5,200
*Install and maintain buoys for seasonal closures and permanent no-wake areas	$4,300	$500
*Human/wildlife interaction disturbance studies	$140,000	
*Law enforcement officer		$62,400
Total	**$996,700**	**$72,200**

Anticipated Impacts of Uses

The discussion below analyzes impacts of the use as proposed under the Preferred Alternative.

General Impacts to Wildlife

Disturbance Effects: Both motorized and nonmotorized boating have been shown to change wildlife distribution and use of particular habitats, alter feeding behavior and nutritional status, and cause premature departure from desirable habitat (Bouffard 1982; Kaiser and Fritzell 1984; Korschgen et al. 1985). Studies have also shown that boating disturbance may cause increased flight time and flushing distances in waterfowl species (Havera et al. 1992; Kahl 1991; Kenow et al. 2003; Knapton et al. 2000). Wildlife species that are more sensitive to recreation-related disturbances (e.g., bald eagles, shorebirds, grebes) may find it increasingly difficult to secure adequate food or loafing sites as their preferred habitat becomes fragmented by disturbance (Burger 1997; Pfister et al. 1992; Skagen et al. 1991).

Restricting sailing regattas to a speed of less than 20 mph and to an area within the middle of the West Pool should reduce some of the disturbance that is seen by vessels using shallow waters and traveling at high rates of speed. The regatta course would be greatly removed from bald eagle, heron, and grebe nesting areas.

Effects to Water Quality

In addition to noise and speed, motorized boats pollute waters with gas and oil. Older two-stroke engines, in which the gas and oil are combined, can discharge as much as 25 percent of the unspent mixture gas directly into the water. Hydrocarbons in gas and oil float on the surface of the water and bioaccumulate in the food web, posing a threat to sensitive shallow lacustrine habitats (Tjarnlund et al. 1995). Hoffman (1998) reviewed several studies, concluding that petroleum hydrocarbons can also be transferred to eggs from the plumage of incubating birds and can be toxic even in small amounts.

There is a possibility of boats aiding in the spread of aquatic invasive species into the waters of the Refuge. Informational media in hunting brochures, placards at launch sites (including Refuge

launches), registration requirements, systematic and periodic inspections, and early detection monitoring help reduce the likelihood of infestation. The Idaho State Department of Agriculture is at the forefront of preventing the spread of aquatic invasive species into the waters of Idaho and works in concert with various agencies including the Service.

Because sailing regatta participants only use their motors to reach the start line from the dock and to return to the dock at the end of the day, these effects would be less than those created by general motorized boat users.

Refuge-specific Impacts

This section evaluates the likely impact at the Refuge, considering the scientific studies discussed above and considering the uses within the context of Deer Flat Refuge.

Vegetation, Soil, and Water Impacts: As described above, the potential for water quality impacts and contaminants in the food web stemming from the release of gas and oil hydrocarbons into Refuge waters would continue to exist. The Refuge would promote the use of CARB star-rated motors at the level of two stars and above to reduce impacts from petroleum hydrocarbons. A total maximum daily load (TMDL) assessment for the Lake Lowell watershed was prepared by the Idaho Department of Environmental Quality (IDEQ) that explored water quality concerns in Lake Lowell. Petroleum hydrocarbon pollution from boats was not explored in the TMDL because the focus was on pollution loads associated with agriculture runoff and other nonpoint sources. Even though oil and grease are listed as pollutants of concern in the Boise River (Lower) Subbasin Hydrologic Subunit, dissolved oxygen, sediment, and nutrients are the focus of the TMDL, because the presence of these pollutants at current levels likely render hydrocarbon levels insignificant (IDEQ 2010).

Disturbance Effects to Wintering and Migrating Wildlife: The wintertime closure is expected to adequately protect wintering and migrating birds using Lake Lowell. It is critical for waterfowl to conserve energy during migration and the cold winter months. Closed areas provide unmolested space for birds as they are resting and refueling for the journey ahead of them.

Disturbance Effects to Colonial-nesting Birds: Colonial-nesting birds at Lake Lowell may be among the most sensitive species subjected to potential disturbance from boating. Lake Lowell is one of only three lakes in Idaho that routinely hosts colonies of nesting western and Clark's grebes, whose breeding population is considered imperiled in the state (IDFG 2005). IDFG has printed pamphlets for public distribution that provide information on conflicts between boaters and grebes and the importance of responsible boating. High-speed boating displaces grebes from preferred habitats, disrupts nesting and feeding, and even causes loss of young (Burger 1997). Grebe adults and chicks are often killed by boats (Ivey 2004; Shaw 1998), and small chicks can become separated from their parents and die of exposure if adults have to dive to avoid motorboats (Storer and Nuechterlein 1992).

Restricting sailing regattas to the middle of the West Pool and to speeds of less than 20 mph should reduce disturbance to colonial nesting birds.

Disturbance Effects to Other Species: The Lake Lowell Unit includes riparian forest, emergent vegetation, and open water habitats that are used extensively by a variety of bird species. The disturbance effects to wildlife described in the General Impacts section above applies to the anticipated effects to wildlife on Deer Flat NWR. It is anticipated that wildlife species using the open

water and emergent plant habitats of the Refuge would benefit from restricting sailing regattas to the middle of the West Pool and to speeds of less than 20 mph.

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from boating would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Impacts to Priority Public Uses

Boating, whether motor-, wind-, or human-powered, may provide additional wildlife-dependent recreational opportunities. However, as described above, given the tendency of birds to flush when subjected to a high intensity of disturbance, wildlife viewing opportunities would be expected to be poor within the portions of the race course that are occupied by up to 25 sailing vessels at one time.

The restriction of sailing regattas to the middle of the West Pool would allow wildlife-dependent users to use the vast majority of the lake without any impacts from this activity. The ability of wildlife-dependent users to cross the race course to reach their destination also reduces any impacts to these users. If safety within the race course becomes an issue in the future, the course may need to be closed to other users, which would create undue impacts to wildlife-dependent and other user groups.

The restriction of sailing regattas to the months of April and May would reduce impacts to wildlife-dependent users because refuge visitation is low during this time. The further restriction of 25 sailing vessels would also reduce impacts by ensuring adequate parking and docking availability.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register.
- Distributed approximately 1,300 copies of Planning Update 1.
- Provided informational presentations to 26 local organizations.
- Held evening call-in hours the second and fourth Wednesdays of the month.
- Held open houses July 28, August 20, and August 21.
- Contacted visitors over eight days in July and August and handed out over 700 flyers.

- Over 1,000 comments were received.

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list.
- Provided informational presentations to 28 local organizations.
- Held open houses on June 3, June 4, July 8, and July 9.
- Attended local festivals.
- Almost 350 comments were received.

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____	Use is Not Compatible
___X___	Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

Cooperative land management agreements would contain the following special conditions to ensure compatibility.

Sailing Regatta Stipulations

- Sailing regattas are required to comply with International Sailing Federation rules, boating rules set forth by the U.S. Coast Guard and the State of Idaho, and all Refuge rules and regulations.
- Sailing regattas are allowed only by Special Use Permit.
- Sailing regattas are allowed only during the months of April and May.
- Sailing regattas are allowed only on weekends that are not being used for bass tournaments (i.e., every other weekend).
- Sailing regattas must be postponed or abandoned when winds are in excess of 20 knots (approximately 23 mph).
- No sailing vessel with hull shape and/or sail configuration that would allow it to reach speeds greater than 20 mph for the wind conditions would be allowed to compete in the regatta.
- Non-regatta users must be allowed to enter into and cross the regatta race course.
- The 30 boat trailer parking spots closest to the ramp would be marked and made available to non-regatta participants.
- The first 60 feet on the inside of each dock at the Lower Dam Recreation Area must be available for non-regatta users at all times. Regatta participants may dock their boats on the rest of the dock during the morning briefing and retrieval at the end of the day.

- Only 25 or fewer sailing vessels are allowed in each regatta.
- Race course buoys must be highly visible to other boaters.
- The race course must be set in waters that reach a depth of 15 feet or greater.

Justification

There are several concerns that must be addressed before any type of competitive group event is allowed on the Refuge.

Safety

Due to the size of the vessels and the height of their sails, sailboats are highly visible to other users. This reduces the likelihood of collisions with other Refuge visitors and allows the area within the racing buoys to be open to other users. Safety is also increased by following all International Sailing Federation rules, boating rules set forth by the U.S. Coast Guard and the State of Idaho, and all Refuge rules and regulations. The speed restriction of 20 mph or less would also help to reduce potential safety issues with other sailors or non-regatta users.

Impacts to Wildlife-Dependent Users

The exclusion of other users from the area in which a competitive activity is occurring can negatively impact other Refuge users. Because sailing vessels are not greatly impacted by wake and because they are very visible to other users, it is not necessary to close their racing course to other Refuge users. Other users can boat within or through the course as needed. If the course were required to be closed in the future, the lack of use of a large area of the lake would be an undue burden for other users.

Use of the docks and parking area could exclude other users. The small number of sailing vessels that would be allowed in each regatta (25) and the requirement to provide the first 60 feet of the inside of each dock for non-regatta users and to provide the 30 boat trailer parking spots closest to the ramp for non-regatta participants should reduce impacts to wildlife-dependent users wanting to launch at the Lower Dam Recreation Area. The requirements to hold regattas only in April and May when visitation is low and to hold them only when no bass tournaments are occurring should also reduce the likelihood of excluding other users through lack of parking or launch spaces.

Impacts to Wildlife

High-speed boating can increase disturbance for many wildlife species. Since sailing regattas by their nature require that a large group of boats all travel in close proximity to one another for at least a portion of the race, the ability of wildlife to retreat from regatta participants may be hindered by the sheer number of vessels and the area that they cover. Restricting the speed of regattas to 20 mph or less would increase the time that wildlife have to respond to approaching vessels.

Open water habitats at Lake Lowell are highly used by a variety of bird species for mating displays, feeding, and loafing and may be impacted by activities taking place in the middle of the lake. Restricting regattas to April and May allows the use to occur during lower visitation periods. Because visitation is lower, there is more open water available outside of the racing area than there would be later in the summer. The reduced use of these other areas allows adequate open water habitat for wildlife during sailing regattas.

Wildlife is especially vulnerable to disturbance during the nesting period, which for many species occurs during the months of April and May. Requiring sailing regattas to use the middle of the West Pool and keeping boats in water that is 15 feet or greater in depth should remove them from any potential nesting areas. Because the course is open to use by other boaters, there is no concern that the regatta would push other users to the periphery and increase disturbance.

Conclusion

Because sailing regattas are able to occur with an open race course, at speeds of 20 mph or less, in water that is 15 feet deep or more, and at a time of year when visitation is low, the impacts to wildlife and wildlife-dependent users, as well as safety concerns, are adequately addressed. Although sailing regattas can result in disturbance to wildlife, disturbance is expected to be intermittent and short term and limited in time and space. There is an adequate amount of undisturbed habitat available to the majority of wildlife for escape and cover.

It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge would not be measurably lessened from this activity. The relatively limited number of individuals expected to be adversely affected due to this use would not cause wildlife populations to materially decline, the physiological condition and production of species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing sailing regattas to occur with stipulations would not materially detract from or interfere with the purposes for which the Refuge was established or the Refuge System mission.

This compatibility determination is specific to sailing regattas at Deer Flat NWR and does not create a precedent for any other competitive group activities.

Mandatory Reevaluation Date

__2024__ Mandatory 10-year Reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

References

Bouffard, S.H. 1982. Wildlife values versus human recreation: Ruby Lake National Wildlife Refuge. Transactions of the North American Wildlife and Natural Resources Conference 47:553-558.

Burger, A.E. 1997. Status of the western grebe in British Columbia. Wildlife Working Report WR-87. B.C. Ministry of Environment, Lands, and Parks. Victoria, British Columbia. 40 pp.

Hoffman, D.J. 1989. Embryotoxicity and teratogenicity of environmental contaminants to bird eggs. Reviews of Environmental Contamination and Toxicology 115:41-50.

IDEQ. 2010. Boise River (Lower) Subbasin, Lake Lowell TMDL. Available at: http://www.deq.idaho.gov/water-quality/surface-water/tmdls/table-of-sbas-tmdls/boise-river-lower-subbasin.aspx. Accessed March 12, 2012

IDFG (Idaho Department of Fish and Game). 2005. Idaho comprehensive wildlife conservation strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. Available at: http://fishandgame.idaho.gov/public/wildlife/cwcs/. Accessed May 18, 2012.

Ivey, G.L. 2004. Conservation assessment and management plan for breeding western and Clark's grebes in California. Prepared for American Trader Trustee Council: an interagency group comprised of representatives from the California Department of Fish And Game, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service. Corvallis, Oregon.

Kahl, R. 1991. Boating disturbance of canvasbacks during migration at Lake Poygan, Wisconsin. Wildlife Society Bulletin 19(3):242-248.

Kaiser, M. and E. Fritzell. 1984. Effects of river recreationists on green-backed heron behavior. Journal of Wildlife Management 48(2):561-567.

Kenow, K.P., C.E. Korschgen, J.M. Nissen, A. Elfessi, and R. Steinbach. 2003. A voluntary program to curtail boat disturbance to waterfowl during migration. Waterbirds 26(1):77-87.

Knapton, R.W., S.A. Petrie, and G. Herring. 2000. Human disturbance of diving ducks on Long Point Bay, Lake Erie. Wildlife Society Bulletin 28(4):923-930.

Korschgen, C., L. George, and W. Green. 1985. Disturbance of diving ducks by boaters on a migrational staging area. Wildlife Society Bulletin 13:290-296.

Pfister, C., B.A. Harrington, and M. Lavine. 1992. The impact of human disturbance on shorebirds at a migration staging area. Biological Conservation 60:115-126.

Shaw, D.W.H. 1998. Changes in population size and colony location of breeding waterbirds at Eagle Lake, California between 1970 and 1997. Thesis. California State University, Chico.

Skagen, S.K., R.L. Knight, and G.H. Orians. 1991. Human disturbances of an avian scavenging guild. Ecological Applications 1:215-225.

Storer, R.W. and G.L. Nuechterlein. 1992. Western grebe (*Aechmorphorus occidentalis*) and Clark's grebe (*Aechmorphorus clarkia*). In: A. Poole and F. Gill eds. Birds of North America, No. 26. Philadelphia, PA., Academy of Natural Sciences and American Ornithologists' Union. 24 pp.

Tjarnlund, U., G. Ericson, E. Landesjoo, I. Petterson, and L. Balk. 1995. Investigation of the biological effects of two-cycle outboard engines' exhaust on fish. Marine Environmental Research 39:313-316.

Compatibility Determination for Sailing Regattas (B.9)

Use is compatible with stipulations.

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager/
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge
Supervisor: _____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

Document continues on the following page.

B.10 Compatibility Determination for Swimming, Beach Use, and Picnicking (including Lower Dam Recreation Area Use)

RMIS Database Use: Swimming, Beach Use, and Picnicking

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future

generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

Swimming, sunbathing, and picnicking on easily accessible beaches are popular activities during the summer months at the Lake Lowell Unit. There are two designated, buoyed swimming areas: at the east end of the Upper Dam and at the Lower Dam Recreation Area. At the Upper Dam designated swimming area, the buoy line is stretched between two docks used by swimmers and sunbathers. There is a buoy line running parallel to the beach at the Lower Dam Recreation Area as well. Swimming is common at both of these areas but also occurs from any open shoreline. Visitors also regularly swim from and sunbathe on boats in the open water and at Gotts Point and at Parking Lot 7.

The most popular swimming areas at the Upper and Lower Dams are in close proximity to the dams and water control structures associated with those dams. Signs and buoys are posted near these structures to warn swimmers about the dangers of swimming near the outlets or jumping off the control structures.

Proposed Uses

In the Preferred Alternative, swimmers and beach users would be directed to the existing designated swimming areas near the Upper Dam and at the Lower Dam Recreation Area. This would reduce potential disturbance from swimmers and beach users to anglers, who are to be given priority under the National Wildlife Refuge Administration Act of 1966, as amended, and to improve emergency response to swimming-related incidents. Although there have been several drowning-related incidents (mostly near-drownings, but there was one swimming fatality in Fiscal Year 2011) at Lake Lowell in the past few years, the Refuge is hopeful that directing shoreline swimmers to designated areas that are easily accessible to rescue personnel would help to minimize safety issues. There would be no lifeguards stationed at the swimming areas. Efforts would also be made at the Upper Dam swim area to further separate swimmers and beach users from anglers by strategic placement of docks and enforcement of designated areas. Swimming would also be allowed in the open water of Lake Lowell from boats outside of no-wake zones. Swimming would not be allowed around fishing or other wildlife-dependent facilities (e.g., docks), or immediately adjacent to boat launch areas. These changes would ensure that the majority of highly used fishing areas would be free of swimming activity.

In the Preferred Alternative, picnicking would be allowed in designated areas at the east end of the Upper Dam and at the Lower Dam Recreation Area. Nonwildlife-dependent group events (e.g., weddings, reunions, birthday parties, and other gatherings) would be allowed only at the Lower Dam Recreation Area because of the availability of parking, restroom, picnic, and trash facilities. Such group events would be required to comply with the stipulations listed below to reduce impacts to visitor safety or the ability of other visitors to use the Refuge in an unobstructed and undisturbed way.

Availability of Resources

Most swimming at Deer Flat NWR would take place at the Upper Dam East and Lower Dam Recreation Areas under the Preferred Alternative. Most of the costs associated with carrying out the improvements described in the Preferred Alternative are one-time expenses (Table B-9). Because the

Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts. Increased volunteer assistance, strengthened existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. When provided the appropriate training, Refuge volunteers, interns, and various user groups can assist with monitoring, education and interpretation programs, and maintenance projects. The Canyon County Sheriff's Office currently purchases, installs, and maintains the swimming buoys. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

Currently, most maintenance of recreational facilities at the Lower Dam Recreation Area (e.g., irrigating and mowing lawns, cleaning restrooms, and maintaining buoys) is provided by Canyon County Department of Parks, Recreation, and Waterways and the Canyon County Sheriff's Office. If the County ever decided to discontinue this assistance, there would be additional costs associated with maintaining this use.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities using the same resource. For instance, rehabilitating the Lower Dam Recreation Area would benefit swimmers and picnickers, but it would also benefit boaters, fisherman, and other visitors. This same cost has been shown in all CDs that may use the new docks.

Table B-9. Costs to Implement Improvements for Lower Dam Recreation Area Users, Swimmers, and Beach Users

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Print/reprint general Refuge brochures	$3,200	$800
*Construct and maintain a visitor contact station	$480,000	$1,600
*Install and maintain comfort station at Lower Dam Recreation Area (LDRA)	$150,000	$1,500
*Rehabilitate LDRA parking area	$50,000	
*LDRA site plan	$40,000	
*Construct and maintain a nature play area	$40,000	
*Install new kiosks and signs at access points and maintain signs	$261,000	$2,700
*Volunteer coordinator to manage enough volunteers for additional outreach at LDRA		$51,000
*Law enforcement officer		$62,400
Total	**$1,024,200**	**$120,000**

Anticipated Impacts of the Use

The discussion below analyzes impacts of the use as proposed under Preferred Alternative 2.

General Response of Wildlife to Disturbance

Immediate responses by wildlife to recreational activity can range from behavioral changes including nest abandonment, altered nest placement, and change in food habits, to physiological changes such as elevated heart rates, increased energetic costs due to flight or flushing, or even death (Belanger and Bedard 1990; Kight and Swaddle 2007; Knight and Cole 1995; Miller and Hobbs 2000; Miller et al. 1998; Morton et al. 1989). The long-term effects are more difficult to assess but may include

altered behavior, vigor, productivity or death of individuals; altered population abundance, distribution, or demographics; and altered community species composition and interactions.

According to Knight and Cole (1991), there are three wildlife responses to human disturbance: avoidance, habituation, and attraction. The magnitude of the avoidance response may depend on a number of factors including the type, distance, movement pattern, speed, and duration of the disturbance; the time of day, time of year, weather; and the animal's access to food and cover, energy demands, and reproductive status (Fernández-Juricic et al. 2007; Gabrielsen and Smith 1995; Knight and Cole 1991).

Habituation is defined as a form of learning in which individuals stop responding to stimuli that carry no reinforcing consequences for the individuals that are exposed to them (Alcock 1993). A key factor for predicting how wildlife would respond to disturbance is predictability. Often, when a use is predictable—following a trail or boardwalk or at a viewing deck—wildlife will habituate to and accept human presence (Oberbillig 2000). Gabrielsen and Smith (1995) suggest that most animals seem to have a greater defense response to humans moving unpredictably in the terrain than to humans following a distinct (and repeated) path.

Knight and Cole (1991) suggest that sound may elicit a much milder response from wildlife if animals are visually buffered from the disturbance. Burger (1999 as cited by Oberbillig 2000) suggests that viewing distances can serve as useful guides for managers lacking good site-specific information and serve as a starting point in determining what is appropriate elsewhere. Some factors that affect viewing distances include the numbers of viewers, the time of day, and noise level. When exposing nonbreeding waterbirds to four types of human disturbances (walking, all-terrain vehicle, automobile, and boat), Rodgers and Smith (1997) concluded that a buffer zone of 330 feet would minimize flushing of foraging or loafing waterbirds. Vos et al. (1985) recommended buffer zones of 820 feet on land and 490 feet over water for great blue herons. Miller et al. (1998) found that the trail zone of influence for forest and grassland birds appears to be approximately 250 feet. Beyond this distance, bird abundance, species composition, and nest predation was not affected by even heavily used recreational trails.

Although swimming areas often include erratic movement and elevated human noise levels, the designated swimming areas on Lake Lowell are not of great concern for wildlife concentrations. Keeping most shoreline swimming contained to designated areas would reduce the amount of wildlife disturbance associated with the activity. The park-like features of the Lower Dam Recreation Area as well as the open water of the Lake Lowell attract wintering and migrating geese in the fall, winter, and early spring. In order to eliminate impacts to wintering and migrating waterfowl in both of these areas, the lake and Lower Dam Recreation Area are closed to all activities October 1 through April 14, with the exception of hunting and fishing within 200 yards of certain shoreline areas during a portion of the closure.

Impacts to Habitat

With use directed to designated beaches, there would be only minimal disturbance to habitat. However, illegal activities on designated beaches do pose threats to wildlife. Litter and human waste are expected problems as well as trespass in the form of visitors violating the daylight-hours-only regulation. Wildfires resulting from beach users are another threat, with fire ignitions potentially resulting from campfires, fireworks, or other sources. Campfires and use of fireworks, although

prohibited, have historically occurred on the beaches and pose a significant threat to habitat and wildlife resources.

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from swimming and beach use would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Human Health

Although there have been several drowning-related incidents (mostly near-drownings, but there was one swimming fatality in Fiscal Year 2011) at Lake Lowell in the past few years, the Refuge is hopeful that directing swimmers to two designated areas that are easily accessible to rescue personnel would help to minimize safety issues. There would be no lifeguards stationed at the swimming areas.

There are human health concerns related to swimming in Lake Lowell. During certain conditions, blue-green algae, the parasites that cause swimmer's itch, and fecal coliform levels can exceed State health standards. The Refuge would work with the Idaho Department of Environmental Quality (IDEQ) and Southwest District Health (SDH) to monitor water quality and, if necessary, close the swimming beaches. When testing at the swimming beach indicates health concerns, testing would also be conducted at other sites around the lake, and the Refuge would work with IDEQ and SDH to institute warnings and closures about water contact at other locations around the lake.

Impact to Priority Public Uses

Swimming and beach use are not wildlife-dependent or priority public uses as designated by the National Wildlife Refuge Administration Act of 1966, as amended. In areas where swimming and beach use occur regularly, fishing is essentially precluded by the noise and commotion, which are not conducive to catching fish or a quality fishing experience. Wildlife observation, education, and interpretation are priority uses that can also be negatively impacted by the presence of swimmers and other beach users.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register.

- Distributed approximately 1,300 copies of Planning Update 1.
- Provided informational presentations to 26 local organizations.
- Held evening call-in hours the second and fourth Wednesdays of the month.
- Held open houses July 28, August 20, and August 21.
- Contacted visitors over eight days in July and August and handed out over 700 flyers.
- Over 1,000 comments were received.

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list.
- Provided informational presentations to 28 local organizations.
- Held open houses on June 3, June 4, July 8, and July 9.
- Attended local festivals.
- Almost 350 comments were received.

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____	Use is Not Compatible
___X___	Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- Visitors engaged in beach activities, including swimming and picnicking, would be directed to two designated areas at the east end of the Upper Dam and at the Lower Dam Recreation Area from April 15 through September 30.
- Shoreline swimming would be allowed in these designated areas and elsewhere, with the exception of around fishing or other wildlife-dependent facilities (e.g., docks) or immediately adjacent to boat launch areas.
- Swimming would be allowed in the open waters of Lake Lowell from boats outside of no-wake zones.
- Designated swim beaches would be monitored for water quality affecting human health.
- Nonwildlife-dependent noncompetitive group events (e.g., weddings, birthday parties, reunions, memorial services, retreats, and other gatherings) with 20 or more participants would be allowed only at the Lower Dam Recreation Area with the following stipulations.
    - Events are first come, first served. Facilities cannot be reserved in advance or by posted notice.
    - Tent size cannot exceed a total of 20 feet by 20 feet to allow access for general visitors.

  - Group events cannot exceed 50 participants to allow access and parking facilities for general visitors.
  - Use of audio devices (e.g., radios, recording and playback devices, loudspeakers, television sets, public address systems, and musical instruments) cannot cause unreasonable disturbance to others in the vicinity and must comply with 50 C.F.R. 27.72.
  - Participants may not be under the influence of alcohol to a degree that may endanger themselves or other persons or property or unreasonably annoy persons in the vicinity. They must comply with 50 CFR 27.81.
  - Participants must place all event trash into the dumpster provided or remove it from the site. No glass containers are allowed.
  - No portable recreational equipment (e.g., inflatable bounce houses, on-water trampolines, zip lines, etc.) are allowed.
  - Participants must park in designated spaces or in a single layer along the cable barrier to ensure that emergency personnel can access the area in case of emergency.
- Use would be restricted to daylight hours only.
- Open fires and fireworks would be prohibited.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
  - Up to 300-yard buffer around eagle nests from February 15 through July 15.
  - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
  - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
    - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
  - Up to 250-yard buffer around heron rookeries from February 1 through July 1
  - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
  - Wildlife closure at Gotts Point from October 1 through January 31.
  - Wildlife closure at Murphy's Neck from October 1 through March 15.
  - Wildlife closure at Lower Dam Recreation Area from October 1 through April 14.
- Refuge staff would monitor impacts of these activities annually to assess compliance with these stipulations, impacts to wildlife and wildlife habitat, and conflicts between user groups. Monitoring data would be used to modify these stipulations or remove the use if necessary to ensure continued compatibility.

Justification

Swimming and beach use are not priority public uses as defined by the National Wildlife Refuge System Administration Act of 1966, as amended. Due to the limited area where most swimming and beach use would occur, these uses are expected to result in a low impact to wildlife and wildlife habitat. It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge would not be measurably lessened from allowing swimming to occur under the prescribed conditions. The relatively limited number of individuals expected to be adversely affected due to swimming would not cause wildlife populations to materially decline, the physiological condition and production of wildlife species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, under these conditions, we do not expect the use to materially interfere with or detract from the mission of Deer Flat NWR or the Refuge System, diminish the purposes for which the Refuge was established, pose significant adverse effects on Refuge resources, or cause any undue administrative burden. Visitor safety would be increased by directing most shoreline swimmers to designated beaches. For many visitors, swimming and beach use at Lake Lowell may provide an introduction to a national wildlife refuge and good opportunity to reach out to them.

Mandatory Reevaluation Date

__2024__ Mandatory 10-year Reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

References

Alcock, J. 1993. Animal behavior: an evolutionary approach. 5th ed. Sunderland, MA: Sinauer Associates.

Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Kight, C.R. and J.P. Swaddle. 2007. Associations of anthropogenic activity and disturbance with fitness metrics of eastern bluebirds (*Sialia sialis*). Biological Conservation 138(1-2):189-197.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Miller, J.R. and N.T. Hobbs. 2000. Recreational trails, human activity, and nest predation in lowland riparian areas. Landscape and Urban Planning 50(4):227-236.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8(1):162-169.

Morton, J.M., A.C. Fowler, and R.L. Kirkpatrick. 1989. Time and energy budgets of American black ducks in winter. Journal of Wildlife Management 53:401-410.

Oberbillig, D.R. 2000. Providing positive wildlife viewing experiences. Deborah Richie Communications. Missoula, MT.

Rodgers, J.A., Jr. and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25(1):139-145.

Vos, D.K., R.A. Ryder, and W.D. Graul. 1985. Response of breeding great blue herons to human disturbance in northcentral Colorado. Colonial Waterbirds 8:13-22.

Compatibility Determination for Swimming, Beach Use, and Picnicking (including Lower Dam Recreation Area Use) (B.10)

Use is compatible with stipulations.

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager/
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge
Supervisor: _____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

B.11 Compatibility Determination for Walking with Pets (other than hunting dogs)

RMIS Database Use: Pets

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future

generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

The Refuge currently allows dogs on-leash at the Lake Lowell Unit. This use currently occurs primarily at the Lake Lowell Unit on all Refuge roads and trails, as well as off-trail in the North Side, East Side, and South Side Recreation Areas. For information about use of dogs while hunting, see the Hunting Compatibility Determination.

The Code of Federal Regulations states that no dog shall be permitted to roam at large on refuge lands (50 C.F.R. 26.21(b)). Refuge regulations would also be consistent with the following local municipal codes for Canyon County that require a dog that is off the property of the owner to be on a physical leash of 6 feet or less. One end of the leash must be attached to the dog, and the other end must be in the hand of a person capable of controlling the dog. (Ord. 83-006, 6-30-83, eff. 7-11-83; Ord. 91-004, 6-24-91). No person owning, harboring, controlling or keeping any dog shall permit the dog to deposit fecal material on any public property without the owner or custodian immediately bagging and removing the material and disposing of it in a proper trash receptacle (City of Nampa Municipal Code 9-5-9).

Proposed Uses

Under the Preferred Alternative, the Refuge would allow people walking with leashed pets to use designated multi-use trails and the Lower Dam Recreation Area during daylight hours and at times of year when walking access is allowed. Visitors walking with their pets would be required to remove feces from the Refuge. This public use would be monitored to ensure it does not interfere with wildlife-dependent uses or impact wildlife resources. If Refuge personnel observe that visitors with pets are routinely not complying with the above requirements, the Service would evaluate the possibility of prohibiting pet walking. This CD will be revised in 10 years or possibly sooner to incorporate additional data and new information.

Availability of Resources

Most of the costs associated with carrying out the improvements, as described in the Preferred Alternative, are one-time expenses (see Table B-10). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts. Increased volunteer assistance, strengthened existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. When provided the appropriate training, Refuge volunteers, interns, and various user groups can assist with monitoring, education and interpretation programs, and maintenance projects. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

Currently, most maintenance of recreational facilities at the Lower Dam Recreation Area (e.g., irrigating and mowing lawns and cleaning rest rooms) is provided by Canyon County Department of Parks, Recreation, and Waterways. If the County ever decided to discontinue this assistance, there would be additional costs associated with maintaining this facility to the current quality.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other CDs for activities using the same resource. For instance, upgrading the fire break to a multiuse trail would benefit people walking with pets, but the trail could also be used by visitors engaged in wildlife observation, photography, and interpretation. This same cost has been shown in all CDs that would use the new trail facility.

Table B-10. Costs to Implement Improvements Necessary to Allow Pet Walking on Designated Trails and in the Lower Dam Recreation Area

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Install multiple-use trail regulation signs	$7,800	$300
*Upgrade fire break	$37,000	$800
Pet feces removal station	$400	$500
*Print/reprint general Refuge brochures	$3,200	$800
*Human/wildlife interaction disturbance studies	$140,000	
*Law enforcement officer		$62,400
Total	**$188,400**	**$64,800**

Anticipated Impacts of the Use

The discussion below analyzes the impact of this use as proposed under the Preferred Alternative.

Authors of many wildlife disturbance studies conclude that dogs with people, on-leash dogs, or loose dogs provoked a more pronounced disturbance reactions from wildlife than humans alone (Sime 1999). The disturbance effects of human intrusion increased when people were accompanied by dogs in studies of different species including shorebirds (Hoopes 1993; Yalden and Yalden 1989, 1990), passerines (Knight and Miller 1996), upland game birds (Baydack 1986) and small mammals (Mainini et al. 1993). Another study suggests that harassment of wildlife by domestic dogs is opportunistic and is associated with the concentration of wildlife in a given area (Jones & Stokes 1977). A follow-up study suggests that dog-induced wildlife flushes increase with the increased density of dogs (Abraham 2001). Free-running and feral dogs have been known to kill quail, rabbits, and deer (Bowers 1953; Lowry and McArthur 1978; Nelson and Woolf 1987). Pure-bred dogs trained to hunt can also ferret out ground-nesting birds and small game animals when left to roam free (Bowers 1953).

Domestic dogs can introduce diseases like parvovirus, canine distemper, and plague to wildlife populations. Diseases like giardia infection and rabies can be transmitted to wildlife and to humans. Muscle cysts can be transmitted through dog feces to ungulate species including mule deer (Sime 1999). Dog waste is also known to host endo- and ecto-parasites and wildlife can contract diseases from contact with dogs or dog wastes (Sime 1999). To reduce this effect on wildlife and people, pet owners would be required to pick up their pet’s feces and dispose of it properly, as is also required by local county and city ordinances.

Nussear et al. (2008) inadvertently showed that unleashed dogs increase the zone of coverage (or zone of influence) beyond what it would be solely by the handler, thereby increasing the potential to disturb or harm wildlife. When wildlife react by moving away from the disturbance or alter behavior by hiding they would be less likely to be observed. Users of a national wildlife refuge should be able to expect to see wildlife during their visit. Because expectations of seeing wildlife and the amount of wildlife actually seen factor into the quality of experience for wildlife-dependent users (Hammitt et al. 1993), the reduction in observable wildlife that would be caused by allowing nonwildlife-dependent uses could result in avoidance of the Refuge by wildlife-dependent users. To reduce this

potential negative effect on wildlife and wildlife-dependent visitors, dogs would still be required to be leashed on the Refuge. The National Wildlife Refuge System Administration Act, as amended, requires that priority consideration be given to wildlife-dependent users, and the presence of dogs is not necessary for nonhunting, wildlife-dependent recreational activities.

These studies are important when considering human/dog disturbance on refuges that have a high concentration of wildlife. Because Deer Flat NWR is an urban refuge with potentially high concentrations of dogs, people walking with dogs would only be allowed to use designated trails and the Lower Dam Recreation Area to reduce their interactions with high concentrations of wildlife and to provide ample quantities of sanctuary where wildlife can find cover.

Although Refuge regulations and Canyon County municipal codes require dogs to be under complete control by an adequate leash, it is common to see unleashed dogs on Deer Flat NWR trails. In fact, the most common violation noted in the Refuge law enforcement logs is “dog(s) off leash.”

The potential adverse effects associated with pet/wildlife interactions would be minimized by requiring that dogs always be on a leash and remain on multiuse trails or in the Lower Dam Recreation Area. Visitor safety should be increased and dog fighting and negative pet/visitor interactions should be reduced by requiring that pets be on leash at all times. In addition, pet feces would be required to be removed. Impacts from pets would be monitored and enforced by Refuge staff to ensure it does not interfere or have any undue negative impacts to wildlife resources or compatible, wildlife-dependent uses.

To reduce impacts to visitors engaging in wildlife-dependent activities, especially those involved in environmental education and interpretive programs, pets would not be allowed on the Nature, Centennial, Murphy’s Neck, or Boardwalk Trails. These trails are, for the most part, narrower than the patrol road trails (East Dike, Kingfisher, Gotts Point, and Observation Hill Trail System), and therefore do not lend themselves to multiple uses. The Centennial and Nature Trails are currently used for environmental education and interpretive programs. To reduce disturbance to these programs and provide adequate space for multiple uses, on-leash pets would only be allowed on the entrance road and the East Dike, Kingfisher, and Gotts Point Trails; the Observation Hill Trail System, and in the Lower Dam Recreation Area. Keeping pets on designated trails and in the Lower Dam Recreation Area would allow wildlife-dependent visitors the opportunity to use several trails without having to interact with pets.

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard’s milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from pet walking would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register
- Distributed approximately 1,300 copies of Planning Update #1
- Provided informational presentations to 26 local organizations
- Held evening call-in hours the second and fourth Wednesdays of the month
- Held open houses July 28, August 20, and August 21
- Contacted visitors over eight days in July and August and handed out over 700 flyers
- Over 1,000 comments were received

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list
- Provided informational presentations to 28 local organizations
- Held open houses on June 3, June 4, July 8, and July 9
- Attended local festivals
- Almost 350 comments were received

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____ Use is Not Compatible
____X____ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- Pets would be required to stay on designated multiuse trails and in the Lower Dam Recreation Area, in personally owned vehicles, and in parking lots only. Designated multiuse trails consist of:
    - Observation Hill Trail System in the North Side Recreation Area;
    - East Dike and Kingfisher Trails in the East Side Recreation Area; and
    - Gotts Point Trail.
- Pets would be required to be on a physical leash (6 feet or less) at all times. One end of the leash must be attached to the pet and the other in the hand of a person capable of controlling the pet.

- Other than what is compliant with stipulation above, training of pets would not be allowed on the Refuge.
- Visitors, walking with leashed pets on designated trails and in the Lower Dam Recreation Area, would be required to immediately bag and remove fecal material and dispose of it in the proper trash receptacles.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures will be open to use from October 1 through January 31.
        - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
    - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
    - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
    - Wildlife closure at Gotts Point from October 1 through January 31.
    - Wildlife closure at Murphy's Neck from October 1 through March 15.
    - Wildlife closure at Lower Dam Recreation Area from October 1 through April 14.
- Use would be restricted to daylight hours only.

Justification

Walking with pets is not generally considered a wildlife-dependent use of a refuge as defined by statute (16 U.S.C. 668dd et seq.). However, this use on Deer Flat NWR facilities is secondary and conducted in conjunction with wildlife-dependent uses like wildlife observation, photography, and interpretation. Potential for wildlife disturbance is minimal when the use is conducted as required by the stipulations, including restricting the use to designated trails and the Lower Dam Recreation Area, requiring pets to be on-leash, and mandating the removal of pet waste.

Potential for wildlife and habitat disturbance is minimal given the indirect approach of this activity, the enforcement of the short leash rule, and the mandatory removal of pet feces. Restricting the disturbance to established trails and the Lower Dam Recreation Area would increase the predictability of public use on the Refuge, allowing wildlife to habituate to nonthreatening activities. These impacts would be monitored and if they, or other impacts, are discovered, this CD would be reevaluated. It is anticipated that wildlife populations would find sufficient food resources and

resting places such that their abundance and use of the Refuge would not be measurably lessened from allowing pet walking on designated trails and in the Lower Dam Recreation Area. The relatively limited number of individuals expected to be adversely affected due to pet walking would not cause wildlife populations to materially decline, the physiological condition and production of wildlife species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted.

Refuge users with pets provide the opportunity for the Refuge to reach out to nontraditional Refuge user groups and to encourage people walking their pets to observe wildlife and to learn about the National Wildlife Refuge System. Due to the close proximity of Deer Flat NWR to the cities of Nampa and Caldwell, the number and variety of users to this urban refuge is expected to grow. For many of these people, using the multiple-use trails and Lower Dam Recreation Area may provide an introduction to a national wildlife refuge.

By enforcing Refuge regulations that are consistent with local municipal codes, as well as designating appropriate facilities, this use would not interfere with fulfilling the purposes of Deer Flat National Wildlife Refuge. The potential for minimal impacts to Refuge resources from this use, when carried out as specified in the stipulations above, would not detract from fulfilling the Refuge purposes, vision, and goals or the NWRS mission.

Mandatory Reevaluation Date

__2024__ Mandatory 10-year Reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

References

Abraham, K. 2001. Interactions between dogs and wildlife in parks on the Berkeley Marina. Unpublished report, submitted to Berkeley Parks and Recreation. Available at: http://nature.berkeley.edu/classes/es196/projects/2001final/Abraham.pdf. Accessed May 18, 2012.

Baydack, R.K. 1986. Sharp-tailed grouse response to lek disturbance in the Carberry Sand Hills of Manitoba. Ph.D. dissertation. Colorado State University, Fort Collins.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Bowers, R.R. 1953. The free-running dog menace. Virginia Wildlife 14(10):5-7.

Hammitt, W.E, J.N. Dunlin, and G.R. Wells. 1993. Determinants of quality of wildlife viewing in Great Smoky Mountains National Park. Wildlife Society Bulletin 21:21-30.

Hoopes, E.M. 1993. Relationships between human recreation and piping plover foraging ecology and chick survival. Thesis. University of Massachusetts, Amherst.

Jones & Stokes Associates. 1977. Dog depredation on wildlife and livestock in California. California Department of Fish and Game. Jones & Stokes. Sacramento, CA. 64 pp.

Knight, R.L. and S.G. Miller. 1996. Wildlife responses to pedestrians and dogs. Final report submitted to City of Boulder Open Space Department. Department of Fishery and Wildlife Biology, Colorado State University. Fort Collins, CO. 24 pp.

Lowry, D.A. and K.L. McArthur. 1978. Domestic dogs as predators on deer. Wildlife Society Bulletin 6:38-39.

Mainini, B., P. Neuhaus, and P. Ingold. 1993. Behavior of marmots *Marmota marmota* under the influence of different hiking activities. Biological Conservation 64:161-164.

Nelson, T.A. and A. Woolf. 1987. Mortality of white-tailed deer fawns in southern Illinois. Journal of Wildlife Management 51(2):326-329.

Nussear, K.E., T.C. Esque, J.S. Heaton, M.E. Cablk, K.K. Drake, C. Valentin, J.L. Yee, and P.A. Medica. 2008. Are wildlife detector dogs or people better at finding desert tortoises (*Gopherus Agassizii*)? Herpetological Conservation and Biology 3(1):103-115.

Sime, C.A. 1999. Domestic dogs in wildlife habitats. Pages 8.1-8.17 in: G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society. 307 pp.

Yalden, D.W. and P.E. Yalden. 1989. The sensitivity of breeding golden plovers *Pluvialis apricaria* to human intruders. Bird Study 36:49-55.

Yalden, P.E. and D.W. Yalden. 1990. Recreational disturbance of breeding golden plovers *Pluvialis apricarius*. Biological Conservation 51:243-262.

Compatibility Determination for Walking with Pets (other than hunting dogs) (B.11)

Use is compatible with stipulations.

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager/
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge
Supervisor: _____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

Document continues on the next page.

B.12 Compatibility Determination for Wildlife Observation, Photography, Interpretation, and Environmental Education

RMIS Database Use: Wildlife Observation, Photography (wildlife), Interpretation and Environmental Education (teaching students)

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette, and Washington Counties, Idaho, and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655). Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuges' names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

- "to further the purposes of the Migratory Bird Conservation Act" and "as a refuge and breeding grounds for migratory birds and other wildlife" (E.O. 7655)
- "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (Migratory Bird Conservation Act [16 U.S.C. 715d])
- "suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species" (16 U.S.C. 460k-1) and "the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors" (16 U.S.C. 460k-2) (Refuge Recreation Act [16 U.S.C. 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future

generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee et seq.]).

Description of Use

Four nonconsumptive wildlife-dependent recreational activities are defined as priority public uses under the National Wildlife Refuge Administration Act of 1966, as amended: wildlife observation, photography, interpretation, and environmental education. These activities can enhance the users' appreciation of the Refuge, the National Wildlife Refuge System, wildlife, their habitats, and the human environment. Because of its proximity to urban areas, Deer Flat NWR is considered an urban refuge and provides an opportunity for many nontraditional refuge users to be exposed to wildlife, habitat, and the National Wildlife Refuge System.

Deer Flat NWR is a popular destination for local visitors as well as tourists from outside the area. In FY11, total Refuge visitation was estimated at 228,000, with the majority of visitation occurring during the summer months. Further broken down, visitation numbers for the four nonconsumptive wildlife-dependent recreational activities are as follows.

- Wildlife observation and photography: 23,900
- Interpretation: 21,000
- Environmental education: 11,000

The Snake River Islands Unit is also open to the public for wildlife observation and photography from June 15 through January 31 on goose-nesting islands and from July 1 through January 31 on heron- and gull-nesting islands. Access to islands would be clearly delineated in the Refuge brochure. The only way to access these islands is with a boat and the amount of use for this activity is unknown.

Wildlife Observation and Photography

On the Lake Lowell Unit, a variety of trails and facilities provide opportunities for visitors who wish to view and photograph wildlife while minimizing disturbance to wildlife, including the East Dike and Kingfisher Trails in the East Side Recreation Area, the Gotts Point Trail, and the Observation Hill Trail System and Centennial and Nature Trails in the North Side Recreation Area. These hiking trails allow visitors to walk in close proximity to riparian, lake, wetland, and upland Refuge habitats. There are wildlife viewing platforms on the Observation Hill Trail and on the Centennial Trail. There is also a bird viewing blind on the Nature Trail where visitors can photograph or observe wildlife. The Refuge also has a 29.5-mile driving tour that highlights birding stops and circumnavigates the Lake Lowell Unit, as well as a 47-mile driving tour that highlights wildlife viewing opportunities at both the Lake Lowell and Snake River Islands Units. When the lake is open to the public, visitors can also observe and photograph wildlife on the open water with the use of motorized and nonmotorized boats. During the winter, visitors can also observe and photograph wildlife from cross-country skis.

Interpretation and Environmental Education

Interpretation and environmental education (EE) opportunities are designed to increase the public's knowledge and understanding of wildlife and wildlife conservation. Many members of the public are not familiar with national wildlife refuges and confuse them with other Federal lands (e.g., National Parks, Bureau of Land Management lands) or with State and County parks. Locally, the Refuge is

commonly referred to as "Lake Lowell," and much of the public does not know that it is a national wildlife refuge that is part of a nationwide system. Providing information through educational programs, written materials, and interpretive panels helps to build an understanding and appreciation of the unique purposes and activities of national wildlife refuges. Providing information regarding the mission of the Service and the purposes of the Refuge, along with specific resource information, to Refuge visitors may alleviate potential negative impacts of visitors on wildlife.

Most interpretive and EE activities occur at or near the Refuge Visitor Center. Guided activities include staff- and volunteer-conducted environmental education programs, teacher workshops, interpretive programs, and special events. Unguided activities include interpretive displays in the Visitor Center, interpretive panels along the Centennial Trail and at Snake River Islands Unit access points, and self-guided trail brochures. The Refuge offers a variety of both on- and off-site hands-on EE programs. The Refuge also puts on an annual BioBlitz festival celebrating biodiversity, a Creepy Critters Halloween event, and a monthly Wild About Life lecture series.

Proposed Uses

Under the Preferred Alternative, the Refuge would improve and expand facilities and programming to enhance wildlife observation, photography, interpretation, and environmental education opportunities as follows:

Wildlife Observation and Photography

- Provide a visitor contact station at the Lower Dam Recreation Area to place a welcome/interpretive facility in an area that currently sees a majority of the Refuge's nonwildlife-dependent users.
- Provide an additional canoe/kayak launch site at Gotts Point to allow users access to an expanded no-wake zone.
- Provide additional trails, for example:
    - 2-mile ADA-accessible interpretive elevated boardwalk between Parking Lots 1 and 3 to provide better access to riparian and lake habitat not only for people with impaired mobility but also for users requesting easier access through the thick riparian vegetation at Lake Lowell.
    - 0.65-mile ADA-accessible interpretive loop trail in riparian habitat between Lower Dam Recreation Area and Murphy's Neck.
    - 0.6-mile bike/walking path from the entrance to the Visitor Center along the entrance road to provide connectivity to possible bike paths.
    - Interpretive trail through restored native area at Lower Dam Recreation Area.
    - A trail between loops of the existing patrol road west of Visitor Center to provide a loop trail experience during eagle nesting season.
    - A trail or improved trail to the Observation Platform from the entrance road parking lot.
    - Additional trails from parking lots to the lakeshore on the south side of Lake Lowell and at Gotts Point to provide the public increased viewing and educational opportunities in riparian habitat types.
    - 1.5-mile self-guided on-water trail looping to the east from Parking Lot 1.
- Maintain existing observation facilities (e.g., towers, platforms) and develop new facilities, for example:

    - A fishing dock/observation platform at north end of Lower Dam Recreation Area near existing Environmental Education Building.
    - Multipurpose (i.e., Big Six) docks along proposed 2-mile ADA-accessible interpretive elevated boardwalk between Parking Lots 1 and 3.
    - Seasonal shorebird observation/photography blind on the northern shoreline of the East Pool east of Tio Lane access for reservation with an SUP. Implement a fee for use comparable to fees at other refuges.
    - Photography blind at Upper Dam Marsh for reservation with an SUP. Implement a fee for use comparable to fees at other refuges.
- Provide observation opportunities through wildlife webcams, for example:
    - Maintain existing osprey nest webcam; and
    - Add grebe, heron, or eagle webcams.

Environmental Education and Interpretation

- Increase interpretation opportunities for visitors at high-use access points, for example:
    - Use staff and volunteers to facilitate guided/roving interpretive programs (e.g., bird walks, nocturnal walks, canoe/kayak paddles); and
    - Develop a nature play area at Lower Dam Recreation Area.
- Update and replace Visitor Center interpretive materials, for example:
    - Develop Refuge video to show at Visitor Center; and
    - Update and replace existing Visitor Center interpretive signs.
- Provide at least 4 on-site outreach events (e.g., BioBlitz, Creepy Critters, National Wildlife Refuge Week) annually to expand public awareness of interpretive themes.
- Update EE program to match themes identified in the CCP.
- Work with local teachers to identify target grades for Refuge EE programs.
- Focus on moving from off-site to on-site EE programs.

Access

- To improve the quality of the nonconsumptive wildlife-dependent recreational activities provided at the Refuge and reduce disturbance to wildlife, the following changes would be made to Refuge access.
- Access to Snake River Islands Unit is restricted to June 15 through January 31 on goose-nesting islands and from July 1 through January 31 on heron- and gull-nesting islands.
- Access to Lake Lowell Unit:
    - Wildlife-dependent users would be allowed off-trail in the East Side Recreation Area all year.
    - Wildlife-dependent users would be allowed off-trail at Gotts Point from February 1 through September 30.
    - To protect nesting birds, access would be allowed only on maintained roads and trails from February 1 through July 31 in the North Side and South Side Recreation Areas and at Murphy’s Neck. During these months, lakeshore access is restricted to 100 meters on either side of trails accessing the lakeshore. Off-trail travel would be allowed August 1 through January 31.
    - Seasonal closures would be in place surrounding important wildlife areas, such as eagle and osprey nests, grebe colonies, heron rookeries, and shorebird feeding areas.

Availability of Resources

Deer Flat NWR is open to all of the priority, wildlife-dependent recreational activities under the Preferred Alternative. Most of the nonstaff costs associated with carrying out the improvements described in the Preferred Alternative are one-time expenses (see Table B-11). Because the Service has limited capacity to staff and maintain facilities and provide law enforcement, the Service would explore all available options to obtain funding to implement these projects, including partnership efforts.

Increased volunteer assistance, strengthened existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. When provided the appropriate training, Refuge volunteers, interns, and various user groups can assist with monitoring, education and interpretation programs, and maintenance projects. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

Currently, mowing and irrigation of the EE building lawn at the Lower Dam Recreation Area is conducted by Canyon County Department of Parks, Recreation, and Waterways. If the County ever decided to discontinue this assistance, there would be additional costs associated with maintaining this facility to the current quality.

Costs marked with an asterisk (*) in Table B-11 represent costs that are also entered into other CDs for activities using the same resource. For instance, rehabilitating the Lower Dam Recreation Area would benefit wildlife-dependent visitors but it would also benefit picnickers, swimmers, and other visitors. This same cost has been shown in all CDs that may use the Lower Dam Recreation Area.

Table B-11. Costs to Administer and Manage Updates to Public Use Programs

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Provide and maintain season off-trail use signs	$1,400	$400
*Provide 4.5 miles of new trails for pedestrian access	$396,800	
*Provide and maintain interpretive and directional signage for new trails	$28,900	$1,600
Provide and maintain interpretive and directional signage for new observation/photography blinds	$2,900	$500
*Provide and maintain signs allowing public use in hunt areas	$1,100	$300
Provide and maintain directional signage	$6,500	
*Install and maintain new docks and buoys	$69,600	$7,400
Install new observation/photography blinds	$120,000	
*Install new kiosks and signs at access points and maintain signs	$261,000	$2,700
*Seasonal nesting closure signs (Lake Lowell and Snake River Islands Units)	$11,000	$5,200
*Maintain new trails and observation/photography blinds		$4,000
Covered learning facilities	$135,600	
*Construct and maintain visitor contact station	$480,000	$1,600
*Install and maintain comfort stations and vault toilet at Lower Dam Recreation Area (LDRA) and Parking Lot 1	$208,200	$3,000
*Create LDRA site plan	$40,000	
*Rehabilitate LDRA parking area	$50,000	

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*****Print/reprint general Refuge brochures	$3,200	$5,200
Update/rehabilitate Visitor Center	$425,000	
Structural evaluation of Visitor Center	$25,000	
*****Nature play area	$40,000	
*****Volunteer coordinator		$51,000
Environmental education specialist		$51,000
*****Law enforcement officer		$62,400
Total	**$2,306,200**	**$196,300**

Anticipated Impacts of Uses

A primary concern for allowing any public use to occur on Deer Flat NWR is to ensure that impacts to wildlife and habitat are maintained within acceptable limits and potential conflicts between user groups are minimized. The discussion below analyzes impacts of the use as proposed under the Preferred Alternative.

General Impacts to Wildlife

After a review of 536 references, Boyle and Sampson (1985) concluded that nonconsumptive outdoor recreation activities often have negative impacts to wildlife and their habitat. Immediate responses by wildlife to recreational activity can range from behavioral changes including nest abandonment, altered nest placement, and change in food habits to physiological changes such as elevated heart rates and increased energetic costs due to flight or flushing, or even death (Belanger and Bedard 1990; Kight and Swaddle 2007; Knight and Cole 1995a; Miller and Hobbs 2000; Miller et al. 1998; Morton et al. 1989; Smith-Castro and Rodewald 2010). The long-term effects are more difficult to assess but may include altered behavior, vigor, productivity, or death of individuals; altered population abundance, distribution, or demographics; and altered community species composition and interactions.

Human activities along trails disturb wildlife, often resulting in flushing from roosting, feeding, nesting, or resting areas. Flushing may result in expenditure of energy reserves, abandonment of preferred habitat, and increased exposure to predation during relocation. Wildlife photographers tend to have significant disturbance impacts because they may remain close to wildlife for prolonged periods (Klein 1993). Casual photographers with low-power lenses may approach wildlife closer than other users. Cole (2004) suggests the following factors as most important in determining recreation impacts: amount of use, type and behavior of use, timing of use, resistance and resilience of the environment, and spatial distribution of use. Specialized wildlife viewers, particularly birders, seek out specific and often rare species. Because these activities may occur during sensitive times of the year (e.g., nesting), and because they often involve close approaches to wildlife for purposes of identification or photography, there is a potential for negative effects (Knight and Cole 1995b).

According to Knight and Cole (1991), there are three wildlife responses to human disturbance: avoidance, habituation, and attraction. The magnitude of the avoidance response may depend on a number of factors including the type, distance, movement pattern, speed, and duration of the disturbance; the time of day, time of year, weather; and the animal’s access to food and cover, energy demands, and reproductive status (Fernández-Juricic et al. 2007; Gabrielsen and Smith 1995; Knight and Cole 1991).

Habituation is defined as a form of learning in which individuals stop responding to stimuli that carry no reinforcing consequences for the individuals that are exposed to them (Alcock 1993). A key factor for predicting how wildlife would respond to disturbance is predictability. Often, when a use is predictable—following a trail or boardwalk or at a viewing deck—wildlife will habituate to and accept human presence (Oberbillig 2000). Gabrielsen and Smith (1995) suggest that most animals seem to have a greater defense response to humans moving unpredictably in the terrain than to humans following a distinct (and repeated) path.

Knight and Cole (1991) suggest that sound may elicit a much milder response from wildlife if animals are visually buffered from the disturbance. Burger (1999 as cited by Oberbillig 2000) suggests that viewing distances can serve as useful guides for managers lacking good site-specific information and serve as a starting point in determining what is appropriate elsewhere. Some factors that affect viewing distances include the numbers of viewers, the time of day, and noise level. When exposing nonbreeding waterbirds to four types of human disturbances (walking, all-terrain vehicle, automobile, and boat), Rodgers and Smith (1997) concluded that a buffer zone of 330 feet would minimize flushing of foraging or loafing waterbirds. Vos et al. (1985) recommended buffer zones of 820 feet on land and 490 feet over water for great blue herons. Miller et al. (1998) found that the trail zone of influence for forest and grassland birds appears to be approximately 250 feet. Beyond this distance, bird abundance, species composition, and nest predation was not affected by even heavily used recreational trails.

Refuge-specific Impacts

Refuge visitation that has an emphasis on wildlife observation, photography, education, and interpretation are projected to increase under the Preferred Alternative and therefore disturbance effects are likely to be somewhat higher than present. However, it is anticipated that the design of Refuge facilities and the stipulations associated with these uses would be sufficient to mitigate these impacts.

People who visit Deer Flat NWR and engage in wildlife observation, photography, environmental education and/or interpretation typically access the Refuge by motorized vehicles using the surrounding public roads and Refuge parking lots. Because of the close proximity to houses and an urban setting, some visitors can easily access the Refuge by walking or biking from their place of residence.

Once on the Refuge, visitors have access to a variety of multiuse trails on which to participate in these nonconsumptive wildlife uses. Foot travel can potentially create disturbance in or near any habitat and result in vegetation trampling as noted above. The current and proposed trails system has been designed to minimize disturbance to wildlife and habitat and the stipulations presented below are intended to further mitigate any potential impacts stemming from these uses. Restricting the disturbance to an established trail during the nesting season would increase predictability of public use patterns on the Refuge, allowing nesting wildlife to habituate to nonthreatening activities. Providing seasonal closures around sensitive wildlife areas would reduce impacts to wildlife while providing recreational opportunities in these areas when the wildlife is less vulnerable.

Under the Preferred Alternative, two photography/wildlife observation blinds and associated access trails would be built, one in the Upper Dam Marsh area and the other near the New York Canal. The construction of these blinds may cause a temporary, short-term impact on wildlife species in the immediate area. Minimal long-term effects are expected to occur as a result of construction.

Increased use of the blind areas is expected to occur adding to the likelihood of disturbance but should be compensated for by the creation of predictable and concentrated visitation. Educational materials that inform visitors of ethical use could reduce impacts and careful placement and camouflaging of blinds would reduce disturbance from this user group.

Most of Deer Flat NWR's education and interpretation programs are large, organized special events that differ from informal day-to-day observation and interpretive activities in that they take place at the existing Visitor Center. These programs have the can overfill parking facilities to the point where parking lots fill and off-site parking and shuttle service is necessary to avoid safety issues. The disturbance associated with these programs are restricted to the area surrounding the Visitor Center and are kept in check by Refuge staff or volunteer leaders who are vigilant about minimizing undue disturbances.

Although disturbance to wildlife from these activities would be higher than at present, the overall effect to Refuge wildlife is expected to be minor. In addition, if disturbance to wildlife or damage to habitat reaches unacceptable levels, the Refuge would limit access to areas where unacceptable impacts occur (see Stipulations section).

Impacts to Listed Species

There are no listed species known to occur on the Refuge. The counties that surround both units of the Refuge have a variety of listed species historically or currently occurring within each county. Of these species only the yellow-billed cuckoo has ever been documented on Deer Flat NWR, and it is currently considered a vagrant because sightings are highly unusual. The Columbia spotted frog could conceivably exist on the Refuge but has not been documented. The condition of habitat for both of these species is either unknown or marginal. The likelihood of any other of the listed species that occur in the surrounding counties existing on the Refuge is slim. Most of these other species have known populations that occur off-Refuge (e.g., Bruneau hot springs snail, Packard's milkvetch) or roam great distances and/or will not find suitable habitat on the Refuge (e.g., North American wolverine, greater sage-grouse). It is anticipated that impacts from nonconsumptive, wildlife-dependent recreation would be negligible. If any use results in unacceptable adverse effects to candidate species or habitats, the Refuge would impose restrictions to mitigate disturbance.

Impact to Habitat

Miller et al. (1998) showed that bird species composition was altered near trails in both forested and grassland ecosystems. Unpaved or unsurfaced trails are susceptible to a variety of trail impacts including vegetation loss and compositional changes to soil structure including compaction and erosion (Adkison and Jackson 1996; Dale and Weaver 1974; Leung and Marion 2000). Trail widening and creation of side trails (social trails) increase the area of disturbed land (Liddle 1975). Impacts that are commonly noted on trails like vegetation damage and soil erosion are unlikely to occur on the well-defined, gravel surface of the East Dike, Kingfisher, Gotts Point, Observation Hill, and Nature Trails or the concrete surface of the Centennial Trail. Allowing off-trail use may cause trampling of plants and disturbance of wildlife. Even though this user group would be required to remain on designated trails during sensitive seasons, some users may disturb wildlife by wandering off to access the lakeshore or a scenic vista or in pursuit of observational/photographic quarry.

Control of invasive plant species on the Refuge is a difficult and never-ending battle. Roads and trails often function as conduits for movement of plant species, including nonnative, invasive species

(Benninger-Truax et al. 1992; Hansen and Clevenger 2005). Refuge visitors can inadvertently carry propagules from invasive plants on clothing or equipment, spreading those plants to new areas. Once established, invasive plants can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. Invasive plants on or near these trails would be controlled and monitored as part of the Refuge's IPM Plan (Appendix G).

Providing and maintaining access points and trails indirectly impacts wildlife by creating barriers to movement through vegetation removal and abrupt edge creation, which may lead to increased predation (Ratti and Reese 1988).

Public Review and Comment

This CD was prepared concurrent with the Deer Flat NWR CCP. The following is a summary of public outreach from July 2010 through September 2012.

July 15-September 10, 2010: First Outreach and Comment Period

- Published Notice of Intent in the Federal Register
- Distributed approximately 1,300 copies of Planning Update #1
- Provided informational presentations to 26 local organizations
- Held evening call-in hours the second and fourth Wednesdays of the month
- Held open houses July 28, August 20, and August 21
- Contacted visitors over eight days in July and August and handed out over 700 flyers
- Over 1,000 comments were received

September 23-25, 2010: Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues

May 27, 2011-July 29, 2011: Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list
- Provided informational presentations to 28 local organizations
- Held open houses on June 3, June 4, July 8, and July 9
- Attended local festivals
- Almost 350 comments were received

Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments were solicited in conjunction with release of the Draft CCP/EIS in order to comply with the National Environmental Policy Act and with Service policy.

Determination

_____	Use is Not Compatible
___X___	Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility

- Proposed changes to boating regulations and facilities are described in the Recreational Boating Compatibility Determination.
- To minimize disturbance to wildlife during the nesting season, pedestrian travel would be restricted to designated trails from February 1 through July 31 in the North Side and South Side Recreation Areas and at Murphy's Neck. During these months, lakeshore access is restricted to 100 meters on either side of trails accessing the lakeshore. Off-trail travel would be allowed August 1 through January 31.
- In the East Side Recreation Area, off-trail travel would be allowed all year because it is a less biologically sensitive area.
- In the Gotts Point area, off-trail travel would be allowed February 1 through September 30.
- Cross-country skiing access would be allowed only on land. Skiing on ice would be prohibited.
- Walking on ice for wildlife observation, photography, interpretation, and environmental education opportunities would be prohibited. Ice access would be allowed only to access ice fishing opportunities in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by the Bureau of Reclamation.
- Lower Dam Recreation Area is open from April 15 through September 30.
- On the Snake River Islands Unit, off-trail travel would be allowed from June 15 through January 31 on goose-nesting islands and from July 1 through January 31 on heron- and gull-nesting islands.
- Recreational access to closed areas would be allowed only under provisions of an SUP with stipulations set by the Refuge Manager.
- Use would be restricted to daylight hours only.
- Open fires would be prohibited.
- Pedestrians should yield right of way to equestrians.
- Collection of plants and animals would be prohibited unless an SUP is obtained from the Refuge (except fish captured while engaged in recreational fishing).
- The Refuge would require an SUP for wildlife-dependent groups of over 20 people to avoid conflicts with other users and management activities.
- Seasonal closures would be implemented as necessary to protect sensitive wildlife habitat. For example:
    - Up to 300-yard buffer around eagle nests from February 15 through July 15.
    - Up to 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - Up to 500-yard closure around grebe colonies (Berg et al. 2004) until July 15 of the following year. If the birds have not renested in the closed area by July 15 of the following year, the closure would be removed. Upland portions of the closures would be open to use from October 1 through January 31.
        - To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a GPS capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system, and a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the proper location. In the first year that grebes

nest, the closure would be based on nests established early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.
  - Up to 250-yard buffer around heron rookeries from February 1 through July 1.
  - Up to 100-yard closure around shorebird feeding and resting areas from July 15 through September 30 during years when the lake level elevation is lower than 2,522 feet.
  - Wildlife closure at Gotts Point from October 1 through January 31.
  - Wildlife closure at Murphy's Neck from October 1 through March 15.
  - Wildlife closure at Lower Dam Recreation Area from October 1 through April 14.
- Refuge staff would monitor impacts of these activities annually to assess compliance with these stipulations, impacts to wildlife and wildlife habitat, conflicts between user groups, and user satisfaction. Monitoring data would be used to modify these stipulations if necessary to ensure continued compatibility of these activities.

Justification

Wildlife photography, observation, interpretation, and environmental education, when compatible, are wildlife-dependent recreational activities considered priority public uses for the National Wildlife Refuge System. Although these activities can result in disturbance to wildlife, disturbance would be intermittent and short-term when activities are conducted according to the stipulations described above. It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the Refuge would not be measurably reduced from allowing these activities to occur. The relatively limited number of individual animals and plants expected to be adversely affected would not cause wildlife populations to materially decline, the physiological condition and production of Refuge species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing wildlife photography, observation, interpretation and environmental education to occur under the stipulations described above would not materially detract or interfere with the purposes for which the Refuge was established or the mission of the National Wildlife Refuge System.

Mandatory Reevaluation Date

__2029__ Mandatory 15-year Reevaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

References

Adkison, G.P. and M.T. Jackson. 1996. Changes in ground-layer vegetation near trails in midwestern U.S. forests. Natural Areas Journal 16:14-23.

Alcock, J. 1993. Animal behavior: an evolutionary approach. 5th ed. Sunderland, MA: Sinauer Associates.

Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

Benninger-Truax, M., J.L. Vankat, and R.L. Schaefer. 1992. Trail corridors as habitat and conduits for movement of plant species in Rocky Mountain National Park, CO. Landscape Ecology 6(4):269-278.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

Boyle, S.A. and F.B. Samson. 1985. Effects of nonconsumptive recreation on wildlife: a review. Wildlife Society Bulletin 13:110-116.

Cole, D.N. 2004. Environmental impacts of outdoor recreation in wildlands. Pages 107-126 in: M.J. Manfredo, J.J. Vaske, B.L. Bruyere, D.R. Field, and P.J. Brown, eds. Society and natural resources: a summary of knowledge. Jefferson, MO: Modern Litho.

Dale, D. and T. Weaver. 1974. Trampling effects on vegetation of the trail corridors of north Rocky Mountain forests. Journal of Applied Ecology 11:767-772.

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Hansen, M.J. and A.P. Clevenger. 2005. The influence of disturbance and habitat on the presence of nonnative plant species along transport corridors. Biological Conservation 125(2005):249-259.

Kight, C.R. and J.P. Swaddle. 2007. Associations of anthropogenic activity and disturbance with fitness metrics of eastern bluebirds (*Sialia sialis*). Biological Conservation 138(1-2):189-197.

Klein, M.L. 1993. Waterbird behavioral responses to human disturbances. Wildlife Society Bulletin 21(1):31-39.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995a. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and D.N. Cole. 1995b. Wildlife responses to recreationists. Pages 51-69 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Leung, Y. and J.L. Marion. 2000. Recreation impacts and management in wilderness: a state-of-knowledge review. Pages 23-28 in: D.N. Cole, S.F. McCool, W.T. Borrie, and J. O'Loughlin, compilers. Wilderness science in a time of change conference—volume 5: wilderness ecosystems, threats, and management; 1999 May 23-27; Missoula, MT. Proceedings RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 395 pp.

Liddle, M.J. 1975. A selective review of the ecological effects of human trampling on natural ecosystems. Biological Conservation 7:17-36.

Miller, J.R. and N.T. Hobbs. 2000. Recreational trails, human activity, and nest predation in lowland riparian areas. Landscape and Urban Planning 50(4):227-236.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8(1):162-169.

Morton, J.M., A.C. Fowler, and R.L. Kirkpatrick. 1989. Time and energy budgets of American black ducks in winter. Journal of Wildlife Management 53:401-410.

Oberbillig, D.R. 2000. Providing positive wildlife viewing experiences. Deborah Richie Communications. Missoula, MT.

Ratti, J.T. and K.P. Reese. 1988. Preliminary test of the ecological trap hypothesis. Journal of Wildlife Management 52:484-491.

Rodgers, J.A., Jr. and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25(1):139-145.

Vos, D.K., R.A. Ryder, and W.D. Graul. 1985. Response of breeding great blue herons to human disturbance in northcentral Colorado. Colonial Waterbirds 8:13-22.

Compatibility Determination for Wildlife Observation, Photography, Interpretation, and Environmental Education (B.12)

Use is compatible with stipulations.

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager/
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge
Supervisor: _____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

B.13 Compatibility Determination for Mosquito Management

RMIS Database Use: Mosquito management

Refuge Name: Deer Flat National Wildlife Refuge

Location: Canyon, Owyhee, Payette and Washington Counties, Idaho and Malheur County, Oregon

Date Established: 1909

Establishing and Acquisition Authorities

Deer Flat National Wildlife Refuge was originally established in 1909 by President Theodore Roosevelt as Deer Flat Bird Reservation as a "preserve and breeding grounds for native birds" (E.O. 1032). In 1937, President Franklin D. Roosevelt revoked Executive Order 1032 and reestablished the Refuge as the Deer Flat Bird Reservation to "further the purposes of the Migratory Bird Conservation Act" and, "as a refuge and breeding ground for migratory birds and other wildlife" (E.O. 7655) . Also in 1937, 36 islands in the Snake River were designated as the Snake River Migratory Bird Refuge (E.O. 7691).

In 1940, the Refuge names were changed by Presidential Proclamation No. 2416, to Deer Flat National Wildlife Refuge and Snake River National Wildlife Refuge respectively. In 1963, Public Land Order 3110 transferred all lands of the Snake River National Wildlife Refuge (consisting of 74 islands) to the direct jurisdiction of Deer Flat National Wildlife Refuge. Any lands (including those in the Snake River Islands National Wildlife Refuge) that were added to Deer Flat National Wildlife Refuge assume the purposes for which Deer Flat National Wildlife Refuge was established as well as keeping any individual purposes that were provided at the time of their establishment or acquisition.

Refuge Purposes

"…to further the purposes of the Migratory Bird Conservation Act" and as a refuge and breeding grounds for migratory birds and other wildlife…" E. O. 7655

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. §§ 715d (Migratory Bird Conservation Act)

"...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species..." 16 U.S.C. §§ 460k-1 and "... the Secretary...may accept and use...real...property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors..." 16 U.S.C. §§ 460k-2 (Refuge Recreation Act [16 U.S.C. §§ 460k-460k-4], as amended)

National Wildlife Refuge System Mission

"The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife,

and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use

This use is not a priority public use as defined by the National Wildlife Refuge System Improvement Act. Mosquito monitoring and treatment on the Lake Lowell Unit of the Refuge would be conducted by the Canyon County Mosquito Abatement District (CCMAD). The mosquito species documented to be breeding on, or residing on the Refuge, and targeted for monitoring and treatment, are *Culex inornata, Culex pipiens, Culex tarsalis, Culex ervthrothorax, Ochlerotatus nigromaculus, Aedes vexans,* and *Anopheles freebornii*.

The Refuge would allow the CCMAD to continue access to the Refuge for monitoring and controlling mosquitoes to address human health concerns in neighboring communities wherever it does not directly conflict with resource protection needs. The Lake Lowell sector of the Refuge is located in Canyon County near the communities of Nampa and Caldwell, Idaho. CCMAD has been managing the mosquito population around the Lake Lowell Sector of the Refuge since 1998. The presence of Western Equine Encephalitis (WEE) was detected in cattle on ranch property that borders the south boundary of the refuge in 1999. Active arbovirus surveillance in the adult mosquito population was initiated in 2000. In 2006 there was a West Nile Virus outbreak in Idaho. The Lake Lowell Unit accounted for 40% of the positive West Nile pools detected and tested in Canyon County during the 2006 epidemic. In 2010 and again in 2011 there was no disease activity noted in the mosquito population on the Refuge.

CCMAD utilizes Integrated Pest Management principles in controlling mosquito population levels on Deer Flat National Wildlife Refuge and only uses *Bacillus thuringiensis israelensis* (Bti) within Refuge boundaries. CCMAD bases all its mosquito abatement decisions on a comprehensive inspection and surveillance program. Both the larval and adult populations are monitored daily during the mosquito production season. Treatments to the mosquito larvae population are made when dip counts of *Culex tarsalis* reach 5 mosquito larvae per dip/10 dips. Only those areas where monitoring has shown that larval mosquito populations have reached or exceeded predetermined species-specific thresholds would be targeted for treatment.

Mosquito Monitoring

To determine pesticide use on the Refuge larval surveillance is first conducted. Larval surveillance locations are throughout the Refuge in both open areas and areas closed to the public. Thresholds are determined by standard mosquito dipping techniques done in open water, along banks, under vegetation, flooded areas, standing water pools that are shallow, catch basins and shoreline habitat.

A two person inspection team is assigned to the Refuge to monitor mosquito population densities. Inspections are conducted on a daily basis starting in late March or early April, depending on spring time weather conditions. CCMAD monitors larval stage mosquito populations and identifies species using the dipper method which entails using a long-handled ladle dipper to collect water samples from pools potentially serving as mosquito sources. Dipping occurs about every 1-2 weeks wherever there are pools of standing water. Dip counts are used to estimate the numbers of immature mosquitoes and to determine the need for mosquito control.

The monitoring activities described above are conducted under an annual special use permit (SUP) granted by the Service to CCMAD. The Refuge proposes to allow the CCMAD to continue these activities under special conditions set forth in the annual SUP. Post treatment monitoring to determine efficacy of control is conducted in the same way, using dip method for larval counts and mosquito light traps for adults, but more frequently and at and around the specific treatment sites.

Density determinations for *Culex* species (primary disease vectors):
Low: 1-4 larvae per dip.
Medium: 5-10 larvae per dip.
High: > than 10 larvae per dip.

The larvae density action level can be used to determine how much, if any, larval control products are to be used. The following is the Action Level Threshold used by CCMAD on the Refuge:

Low population density: No action taken.
Medium population density: Use 5-7 lbs. per acre of Bti.
High population density: Use 7-10 lbs. per acre of Bti.

Mosquito Control

Currently the only biological control agents used on the Refuge is *Bacillus thuringiensis israelensis* and *B. sphaericus*.

Bti/Bs Agents used:

- VectoMax FG. EPA reg. no 73049-429
- Vectobac GR. EPA Reg. No. 73049-486
- Teknar CG. EPA Reg. No. 73049-19
- Aquabac G. EPA Reg. No. 62637-3

1. Bti liquid products are applied by backpack sprayer or hydraulic power spray equipment if large areas are treated.
2. Before aerial applications are conducted CCMAD will notify the Refuge Manager with action threshold data and map location of proposed aerial application.
3. Treatment site would be posted 24 hours before aerial application is made with the following information and when feasible, applications will be scheduled in the early morning at sunrise.

- Date and approximate time of application.
- Pesticide used.
- Contact Phone Number of CCMAD for any questions.
- Method of Application: example: Low Flying Aircraft dropping granular product.

Mosquito Treatment (Larvicides/Pupacides)

There are currently five general categories of larvicides/pupacides used for mosquito control in the United States-biological, organophosphate, insect growth regulator, oil and monomolecular film. Temephos is an organophosphate insecticide with broad-spectrum activity and high toxicity toward birds and fish and will therefore not be considered further. Methoprene and diflubenzuron are insect growth regulators. Methoprene poses reduced ecological risk and equivalent efficacy compared to diflubenzuron. Therefore, diflubenzuron will not be considered further. GB 1111 is a petroleum distillate, categorized as an oil. Monomolecular films are an isostearyl alcohol compound.

Larvicides (Bti). Bti is a microbial insect pathogen used to control larval stages of mosquitoes and black flies. It is a naturally occurring anaerobic spore forming bacteria that is mass produced using modern fermentation technology. Formulated Bti products contain bacterial spores and protein endotoxins that are activated in the alkaline mid-gut of insect species and subsequently bind to protein-specific receptors of susceptible insect species, resulting in the lethal response (Lacey and Mulla 1990). Therefore, Bti must be ingested by the target insect to be effective; mosquito pupa and adults are not affected. Bti is available in granular and liquid formulations. The granular formulations are applied at rates of 5-20 pounds of formulated product per acre. The liquid formulations are applied at rates of 0.25-2 pints of formulated product per acre.

Larvicides (Bsp). Like Bti, Bsp is a microbial insect pathogen with a similar mode of action (Walton et al. 1998). Formulated Bsp products used as mosquito larvicides consist of bacterial spores and protein endotoxins. Bsp is available in two granular formulations, Vectolex CG and Vectolex WDG. Vectolex CG is applied at rates of 5-20 pounds of formulated product per acre. Vectolex WDG is applied at rates of 0.5-1.5 pounds of formulated product per acre. Both Bti and Bsp may be applied as a spot treatment to small areas or broadcast over larger areas by ground (e.g., backpack, truck mounted broadcasters) and/or aerial (fixed-wing or helicopter) equipment.

Proposed Use

The Refuge would allow the CCMAD to continue access to the Refuge for monitoring and controlling mosquitoes to address human health concerns in neighboring communities wherever it does not directly conflict with resource protection needs. The Lake Lowell sector of the Refuge is located in Canyon County near the communities of Nampa and Caldwell, Idaho. The Canyon County Mosquito Abatement District has been managing the mosquito population around the Lake Lowell Sector of the Refuge since 1998.

Availability of Resources

Refuge staff responsibilities for projects by non-Service entities will primarily be limited to the following: review of proposals, preparation of Special Use Permit(s) and monitoring of projects to ensure that impacts and conflicts remain within acceptable levels. Administrative, logistical, and operational support may be provided within the station's general operating budget.

Costs marked with an asterisk (*) in the table below represent costs that are also entered into other Compatibility Determinations for activities that will be affected by the research. For instance, studies that determine the quality of wildlife-dependent recreation opportunities will help the Refuge better manage these uses and improve programs. Therefore, the cost will also be reflected in the Compatibility Determinations for each of the wildlife-dependent uses.

Anticipated Impacts of the Use

Specific areas treated, and the aerial extent of treatment, would vary from year to year, depending on mosquito populations and environmental conditions. While most disturbances would be confined to the targeted wetland, some disturbance related to accessing the monitoring and treatment sites is expected to occur in upland and riparian areas. A primary concern for allowing any use to occur on Deer Flat NWR is to ensure that impacts to wildlife and habitat are maintained within acceptable

limits and potential conflicts between user groups are minimized. The discussion below analyzes impacts of the use as proposed under Preferred Alternative 2.

Researchers and scientists are not exempt from the negative impacts that human presence has on wildlife and wildlife habitat. Even death of animals due to the use of lethal collection methods as well as accidental death and injury from trapping, handling and other invasive procedures (pit-tagging, force feeding, and blood collection) can occur. During duck banding efforts it is not uncommon for the rocket nets to kill a few (>5) ducks when deployed. In an extreme example, a study conducted in Utah looking at pronghorn fawn mortality noted that 20% of the fawns died due to abandonment as a result of researcher handling (Beale and Smith 1973). Some level of disturbance is expected with the monitoring and treatment of mosquitos on the Refuge since some of these activities would be conducted in areas that are normally closed to the public. These impacts to Refuge wildlife and habitats will be minimized because Special Use Permits will include conditions to ensure that impacts to wildlife and habitats are kept to a minimum.

The mere presence of humans can cause disturbance to wildlife. The magnitude of the avoidance response may depend on a number of factors including the type, distance, movement pattern, speed, and duration of the disturbance, as well as the time of day, time of year, weather; and the animal's access to food and cover, energy demands, and reproductive status (Knight and Cole 1991; Gabrielsen and Smith 1995, Fernandez-Juricic 2007). Knight and Cole (1991) suggest that sound may elicit a much milder response from wildlife if animals are visually buffered from the disturbance.

Habituation is defined as a form of learning, in which individuals stop responding to stimuli that carry no reinforcing consequences for the individuals that are exposed to them (Alcock 1993). A key factor for predicting how wildlife would respond to disturbance is predictability. Often, when a use is predictable—following a trail or boardwalk or at a viewing deck—wildlife will accept human presence (Oberbillig 2000). Gabrielsen and Smith (1995) suggest that most animals seem to have a greater defense response to humans moving unpredictably in the terrain than to humans following a distinct path.

Some effects would occur through disturbance which is expected with some activities, especially where researchers are entering sanctuaries or sensitive island habitat with colonial nesting birds. Disturbance to breeding, resting and feeding wildlife and their habitats may occur through frequent contact with technicians performing monitoring activities. Results of disturbance could include the abandonment of nest resulting from frequent visitation to nest or breeding sites. Staff (and contracted professionals) conducting research also have the propensity to disturb wildlife with equipment used in current and future inventory and monitoring surveys. Grebes are particularly vulnerable to boats which are used extensively when studying them. Trucks and high powered spotlights may disrupt and confuse nocturnal feeding deer as well as foraging owls during spotlight surveys. Low flying aircraft toting FLIR surveying equipment may also cause a disturbance to Refuge wildlife.

Control of invasive plant species on the Deer Flat NWR is a difficult and never ending battle. Roads and trails often function as conduits for movement of plant species, including nonnative, invasive species (Hansen and Clevenger 2005). Invasive plants on or near these trails would be controlled as part of the Refuge's noxious weed abatement program. Monitoring of invasive species would also be a part of this plan, reducing the potential for invasive species to become newly established on the

trail. Introduction of invasive plants is possible from ground disturbance associated with the transportation of source seed on equipment and personnel.

The majority of negative impacts associated with mosquito abatement at this station would be offset by the positive effects of a strong and viable mosquito control program. Health and human safety both on the Refuge and in the surrounding community are a necessary part of this plan. The mosquito abatement program is an important tool in maintaining environmental health as well as ensuring the quality wildlife-dependent recreation opportunities.

Public Review and Comment

The following is a summary of public outreach from July 2010 – September 2012.

July 15 - September 10, 2010 - First Outreach and Comment Period

- Published Notice of Intent in the Federal Register
- Distributed approximately 1300 copies of Planning Update #1
- Provided informational presentations to 26 local organizations
- Held evening call-in hours the 2nd and 4th Wednesdays of the month
- Held open houses July 28, and August 20 & 21
- Contacted visitors over 8 days in July and August - Handing out over 700 flyers
- Over 1000 comments were received

September 23- 25, 2010 - Work Sessions

- Invited stakeholders to brainstorm potential solutions to key management issues.

May 27, 2011 - July 29, 2011 - Preliminary Draft Alternatives Outreach and Comment Period

- Distributed Planning Update #3 to the mailing list
- Provided informational presentations to 28 local organizations,
- Held open houses on June 3 & 4, July 8 & 9,
- Attended local festivals
- Almost 350 comments were received

April 2012 – May 2012 - Draft Alternatives Outreach and Comment Period

Determination

___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility

Mosquito monitoring and abatement activities have the potential to disturb wildlife and the habitat on which they rely. In order to minimize impacts, to the greatest extent possible, the following stipulations would be put in place to ensure compatibility:

- The minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, and vertebrates) will be collected for any project.

- Mosquito abatement will be conducted under a Special Use Permit which will have additional project-specific stipulations. All Special Use Permits will have a definite termination date in accordance with 5 RM 17.11. Renewals will be subject to Refuge Manager–review of research data, status reports, compliance with compatibility determination, Special Use Permit stipulations, and other permits

- All chemicals used for mosquito abatement activities must be presented as part of the annual SUP and approved by USFWS personnel prior to use.

- CCMAD are responsible for acquiring and/or renewing any necessary state and federal permits prior to beginning or continuing their project.

- A Section 7 consultation under the Endangered Species Act would be required for activities that may affect a federally threatened, endangered, or proposed species.

- If monitoring or spraying can only be conducted during a sensitive or critical time, (i.e. the breeding season) it will only be permitted where there are specific protocols to minimize disturbance.

- If unacceptable impacts or issues arise or are noted by Refuge staff, the Refuge Manager can suspend/modify conditions/terminate on-refuge activities that is already permitted and in progress.

- Status updates and situation reports are required at least annually, and final reports are due within one year of the completion of the seasonal abatement efforts, unless negotiated otherwise.

- At any time, Refuge staff may accompany the mosquito abatement technicians.

- Highly intrusive or manipulative activities are generally not permitted in order to protect wildlife populations and habitat.

- Mosquito abatement or monitoring activities in sensitive areas may be denied, depending on the specific circumstances.

- All Refuge rules and regulations (CFR 50) must be followed unless otherwise accepted in writing by Refuge management.

- Extremely sensitive wildlife habitat areas will be avoided unless sufficient protection is implemented to limit the area and/or wildlife potentially impacted by activities.

- Research activities will be modified to avoid harm to sensitive wildlife and habitat when unforeseen impacts arise, such as a wildfire altering landscape conditions or large declines in a population.

- All samples and specimens collected from the Refuge are Refuge property. Service personnel shall be provided access to the samples and specimens at any time at no cost (unless arrangements are made to the contrary).

- The Refuge Biologist will review all research proposals and identify any conditions of the research permits that eliminate or minimize negative impacts to any one area, species, or habitat of the Refuge. The Refuge Biologist will make a recommendation to the Refuge Manager on whether the research should occur, based on weighing of benefits and impacts.

- Research requiring the collection of animals will only be authorized after careful consideration by the Refuge Biologist and Refuge Manager as to the importance of Refuge populations to the conservation of the species, the possible adverse impacts to the Refuge populations, and the humaneness of the collection methodology.

- Refuge staff will monitor mosquito abatement projects to ensure that on-going research is not causing long term habitat damage or impacting any animal populations.

Justification

Mosquito inventory/monitoring and abatement efforts on refuge lands are inherently valuable to the Service because they will expand scientific and environmental health information available for resource management decisions. By allowing the use to occur under the stipulations described above, it is anticipated that wildlife species that could be disturbed during the use would find sufficient food resources and resting places outside of disturbed areas, so their abundance and use will not be measurably lessened on the Refuge.

Refuge monitoring and research can contribute to improved management of fish, wildlife, plants and their habitat, visitor services programs, and cultural resources through the application of knowledge gained. Biological integrity, diversity and environmental health will benefit from scientific research conducted on natural resources at the Refuge as provided in the 1997 Improvement Act. It is anticipated that monitoring of research projects, as needed, will prevent unacceptable or irreversible impacts to wildlife and their habitats, and therefore, these projects will not materially interfere with or detract from fulfilling refuge purposes; contributing to the mission of the NWRS; and maintaining the biological integrity, diversity, and environmental health of the Refuge or the National Wildlife Refuge System.

The Refuge manager and biologist will ensure that proposed monitoring and research investigations will contribute to the enhancement, protection, conservation, and management of native wildlife populations and their habitats on the Refuge, thereby helping the Refuges fulfill the purposes for which they were established, as well contributing to the mission of the Refuge System.

Mandatory Reevaluation Date

__X/XXXX__Mandatory 10-year Reevaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

_____X_____Environmental Impact Statement and Record of Decision

References

Alcock, J. 1993. Animal behavior: an evolutionary approach. Fifth ed. Sinauer Assoc., Sunderland, MA. 625pp.

Beale, D. M. and Smith, A.D., 1973. Mortality of Pronghorn Antelope Fawns in Western Utah *The Journal of Wildlife Management*, Vol. 37, No. 3 (Jul., 1973), pp. 343-352.
Gabrielson, G. W. and E. N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in R. L. Knight and K. J. Gutzwiller, ed. Wildlife and Recreationists: coexistence through management and research. Island Press, Washington, D. C. 372pp.

Fernández-Juricic E., Zollner P.A., LeBlanc C., and Westphal L.M., 2007 Responses of Nestling Black-crowned Night Herons (Nycticorax nycticorax) to Aquatic and Terrestrial Recreational Activities: a Manipulative Study. Waterbirds, 30(4):554-565. 2007. The Waterbird Society

Hansen, M.J. and Clevenger, A.P. 2005. The influence of disturbance and habitat on the presence of non-native plant species along transport corridors. Biological Conservation 125 (2005) 249–259

Knight, R. L. and D. N. Cole. 1991. Effects of recreational activity on wildlife in wildlands *in* Transactions of the North American Wildlife and Natural Resources Conference. 56:238-247.

Oberbillig, D.R. 2000. Providing positive wildlife viewing experiences. Deborah Richie Communications, Missoula, MT.

Compatibility Determination for Mosquito Management (B.13)

Prepared by: _____ _____
(Signature) (Date)

Refuge Manager /
Project Leader
Approval: _____ _____
(Signature) (Date)

Concurrence:

Refuge Supervisor:_____ _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System: _____ _____
(Signature) (Date)

Appendix C. Implementation

C.1 Overview

Implementation of the comprehensive conservation plan (CCP) would require increased funding, which would be sought from a variety of sources. This plan would depend on additional Congressional allocations, partnerships, and grants. There are no guarantees that additional Federal funds would be made available to implement any of these projects. Other sources of funds would need to be obtained (both public and private). Activities and projects identified would be implemented as funds become available.

Many of the infrastructure and facility projects (i.e., Refuge roads) would be eligible for funding through construction or Federal Lands Highway Program funds.

The CCP proposes several projects to be implemented over the next 15 years. All of these projects will be included in Service databases that are used to request funding from Congress. Currently, a large backlog of maintenance needs exists on Deer Flat National Wildlife Refuge (Deer Flat NWR or the Refuge). An attempt at reducing this backlog needs to be made and is included here in the analysis of funding needs.

Annual revenue sharing payments would continue to Canyon, Payette, Owyhee, and Washington Counties in Idaho, and Malheur County in Oregon. At this time, no expansions are planned through the purchase of inholdings or through an expanded Refuge boundary.

Monitoring activities would be conducted on a percentage of all new and existing projects and activities to document wildlife populations and changes across time, habitat conditions, and responses to management practices. Actual monitoring and evaluation procedures would be detailed in step-down management plans.

C.2 Costs to Implement CCP

The following sections detail both one-time and recurring costs for various projects. One-time costs reflect the initial costs associated with a project, such as the purchase of equipment, contracting services, construction, and the like. Recurring costs reflect the future operational and maintenance costs associated with the project. Costs have been summarized by their association with either public use programs, or wildlife and habitat management. All costs were calculated in 2011.

C.2.1 One-time and Recurring Costs Common to All Alternatives

Some projects, programs, and maintenance would occur under all alternatives. These costs are already covered by the current Refuge budget and are included in the following tables. The current funding that is received by the Refuge was used as a baseline to start from for all alternatives. Some of the programs and projects paid for by this funding are listed below. Differences between alternatives for new one-time and recurring costs can be found in Sections C.2.2 and C.2.3 respectively.

The 2011 budget for nonstaff costs was approximately $204,700. Examples of projects, programs, and maintenance that are covered by this budget include the following:

- Current maintenance of existing trails
- Current maintenance of existing observation facilities
- Current maintenance of existing buildings
- Permitting for bass tournaments
- Current hunting programs on Lake Lowell and Snake River Islands Units (including youth waterfowl hunt)
- Maintenance of existing signage
- Maintenance of the Lower Dam Recreation Area (if partnership with Canyon County continues)
- Winter wildlife closures of Gotts Point, Lake Lowell, and the Lower Dam Recreation Area.
- Current wildlife and administrative closures on the southeast end, the northwest end, and around the shop complex
- Seasonal closures around current eagle and osprey nests
- Partnership with Idaho Department of Fish and Game for carp removal
- Invasive species control at current acreage
- One volunteer recognition event per year
- Current volunteer projects
- Current events
- Utilities for existing facilities

Some programs, projects, and maintenance that are currently paid for by the operational budget of the Refuge would be reduced to increase alternative programs without an increase in cost.

Environmental Education versus Interpretation. In Alternatives 2 and 3, on-site interpretive programs would be emphasized over traditional environmental education (EE) programs. These interpretive programs could include guided walks, on-water kayak/canoe trips, and guided walks at night or into closed areas. In these programs, Refuge staff and volunteers would aim to interact with visitors at high-use access points to increase awareness of the Refuge and its wildlife and habitats. In order to provide an increase in interpretive programs, the EE program (especially from April 15 through September 30) would need to be reduced. Scout Days, day camps, off-site programs, and the on-site Discover Wildlife Journeys program may be reduced or restructured in order to allow enough staff and volunteer time to provide for increase on-site interpretation. By shifting focus from EE to interpretation, no extra cost is anticipated for the increase in interpretive programs.

The following descriptions summarize the costs that would be required to accomplish each alternative and area above and beyond the current base operations budget.

C.2.2 New One-time Costs Related to Public Use

One-time costs are project costs that have a startup cost associated with them, such as purchasing a new vehicle for wildlife and habitat monitoring or designing and installing an interpretive sign. Some are full project costs for those projects that can be completed in three years or less. One-time costs can include the cost of temporary or term salary associated with a short-term project. Salary for new positions and operational costs are reflected in operational or recurring costs. Funds for one-time costs would be sought through increases in Refuge base funding, special project funds, grants, and the like. The majority of new one-time costs are associated with the upgrade and enhancement of facilities, signage, and programs for the visiting public.

Boardwalk. A trail on the south side of the Refuge was suggested by several members of the public during the scoping phase of the CCP's development. Any ground-level trail would be inundated by irrigation water for much of the winter, spring, and fall, which would cause major maintenance issues and likely result in the trail being unavailable to Refuge visitors. Because of these issues, any trail in the riparian zone on the south side of the Refuge would need to be elevated. Cost projections (Table C-1) were made based on Region 1 engineering cost estimates and previously constructed boardwalks. Due to the projected cost for the 2-mile boardwalk between Parking Lots 1 and 3, it is not proposed in the Preferred Alternative (Alternative 2). Instead, the trail concept would be investigated further, under Alternative 2, to determine if a lower cost option is available.

Table C-1. One-time Costs for Boardwalk Construction ($ in thousands)

New Trails	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Miles of Trail	Cost	Miles of Trail	Cost	Miles of Trail	Cost	Miles of Trail	Cost	
Boardwalk	-	-	-	-	2	$5,848	-	-	L
Total Cost for Boardwalk Construction		**-**		**-**		**$5,848**		**-**	

New Trails and Signage. Because the status quo alternative takes into account public use at its current trajectory, some trail upgrades would need to occur even under this alternative. There are currently no trail heads or maps designating trails. This has led to confusion over the distinction between trails and firebreaks. Visitors currently use a firebreak by the Refuge entrance as a trail, but other firebreaks were not meant to be used as trails. In order to eliminate this confusion, the firebreak that stretches from the entrance parking area to the observation blind would be turned into a trail even under the status quo alternative. Signage would also be upgraded to ensure that users know when they are on a designated trail and what regulations exist. Because of the multiple-use nature of all trails in Alternative 1, signs would also be needed to address right-of-way and expected behavior for different types of uses. Although no new alterations would be made to increase access for nonwildlife-dependent users, alterations to the current horse walk-through would need to be made to ensure safety of riders. Confusion over on- and off-trail uses has existed for many years. Although the last compatibility determination requires on-trail travel, most visitors are unaware of this regulation. Trail use regulations differ across alternatives. Costs associated with a varying number of regulatory signage for trail use would also be needed under all alternatives. Costs for both interpretive and regulation signs have been accounted for.

Changes to public use within the hunt areas, as well as a current need to improve safety along the Lake Lowell Unit boundary, would also require new signs in the hunt area. These signs would remind hunters not to fire over or toward the Refuge boundary, and in some alternatives remind both hunters and other users to be aware of each other.

In an attempt to address scoping comments that took issue with pet feces on the trails, the Refuge would require visitors walking pets to pick up their pet's feces under Alternative 2. Given the current trajectory of use by visitors with pets, and the complaints that the Refuge has already received, the Refuge would supply feces removal bags under Alternatives 1 and 2. Because pets are allowed in more areas under Alternative 1, more bag dispensers would be needed.

An overview of the costs for new trails and signage can be found in Table C-2.

Table C-2. New One-time Costs for New Trails and Signage ($ in thousands)

New Trails	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Miles of Trail	Cost	Miles of Trail	Cost	Miles of Trail	Cost	Miles of Trail	Cost	
Ground-level trails	0.63	$37	4.5	$397	2	$359	1.5	$234	M
Signs for trails and boardwalk		$24		$29		$50		$27	H
Alterations to allow dogs and horses		$2		$1		-		-	H
Hunting area signs		$1		$1		$1		$1	H
Multiuse trail signs		$16		$8		-		-	H
Total Cost for Trails and Signs		**$80**		**$436**		**$410**		**$262**	

Dock and Blinds. In order to provide additional opportunities for fishing, wildlife observation, and photography, new docks and blinds would be installed at the Refuge in Alternatives 2 through 4. During the scoping period, commenters requested additional access to the shoreline for these types of activities. Because the Refuge currently does not offer waterfowl hunting opportunities that are accessible to people with physical disabilities, an ADA-accessible hunting blind would be installed under Alternatives 1, 2, and 4. In Alternative 3, the dock associated with the boardwalk at Parking Lot 1 would be used as an ADA-accessible hunting blind during the waterfowl hunting season. An overview of the number of docks and blinds, as well as the associated costs by alternative, can be found in Table C-3.

Table C-3. New One-time Costs for New Docks and Blinds ($ in thousands)

New Docks and Blinds	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	#	Cost	#	Cost	#	Cost	#	Cost	
Docks	0	-	2	$45	4	$89	2	$45	M
Blinds and signage	0	-	2	$123	2	$122	1	$60	L
Accessible hunting dock	1	$25	1	$25	Accounted for in docks cost		1	$25	H
Total for Docks and Blinds		**$25**		**$193**		**$211**		**$130**	

Kiosks. Many visitors to Lake Lowell do not know that they are visiting a national wildlife refuge. In an attempt to address this concern, the Refuge would install kiosks at high-use areas of the Lake Lowell Unit and add one additional kiosk at a boat ramp along the Snake River. Both kiosk construction and interpretive signage were accounted for in the cost analysis (see Table C-4).

Table C-4. New One-time Costs for New Kiosks and Associated Signage ($ in thousands)

New Kiosks	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	#	Cost	#	Cost	#	Cost	#	Cost	
Kiosks for access points at Lake Lowell and Snake River Islands Units	0	-	5	$207	5	$ 207	5	$ 207	M
Signs for new kiosks	0	-	42	$55	42	$55	42	$55	M
Total for Kiosks		-		**$262**		**$262**		**$262**	

Environmental Education (EE) and Interpretation Facilities. The Refuge currently uses the Environmental Education Building at the Lower Dam Recreation Area to provide opportunities for self-service environmental education activities for groups. Scout groups are the most frequent users of this facility. During a recent facilities condition assessment, regional Service staff identified cracking in the exterior walls of both the Visitor Center and the Environmental Education Building. Regional staff suggested that the Environmental Education Building be tested for structural soundness and updated as needed. In Alternatives 2 through 4, this building would be removed or renovated to create a visitor contact station to support the increased interpretive programs at the Lower Dam Recreation Area. Therefore, an estimated cost for testing and rehabilitation of the Environmental Education Building is included in Alternative 1 and not in the other alternatives.

Comments during the scoping process identified the lack of visitor knowledge of the Refuge. In order to address this issue, a small visitor contact station would be established at the Lower Dam Recreation Area. Providing volunteer and staff contact at this high-use area would increase the ability of the Refuge to provide information on its purpose and the importance of its wildlife and habitats. The contact station should help increase the enjoyment of visitors by providing information about recreational opportunities around the Refuge. This contact station could also act as a base of operations for the roving interpreters and would double as a fee station under Alternative 3.

Covered learning facilities would be constructed under Alternatives 2 through 4. These structures would provide covered areas to gather school children during EE programs. Currently, children have no cover from weather during the outdoor portions of their field trips. Since field trips are scheduled mostly in the spring and fall, weather can reach extremes of intense sunshine and pouring rain. In an attempt to give children a dynamic opportunity to experience nature, the Refuge would install a nature play area under Alternatives 2 and 3. The cost of this area includes design. See Table C-5 for analysis of the future of environmental education and interpretation facilities across alternatives.

Table C-5. New One-time Costs for EE and Interpretation Facilities ($ in thousands)

EE and Interpretation Facilities	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
2 covered learning facilities	-	$136	$136	$136	L
Structural evaluation of Visitor Center	$25	$25	$25	$25	H
Update/rehabilitate Visitor Center	$425	$425	$425	$425	M
Structural evaluation and update/rehab of Environmental Education Building	$174	-	-	-	H
Visitor contact station at Lower Dam Recreation Area	-	$480	$480	$480	M
Nature play area	-	$40	$40	-	M
Total EE and Interpretation Facilities	**$624**	**$1,106**	**$1,106**	**$1,066**	

Other Facilities. Several comments were received requesting improved bathroom facilities on the Refuge. Two new facilities have been suggested in Alternatives 2 and 3. The Lower Dam Recreation Area is in need of renovation. It currently is partially paved, and that pavement is in disrepair. Parking and access for boat launches, buildings, and beaches are extremely restricted on busy weekends. A new site plan would also be created in all alternatives to improve functionality, traffic flow, and safety at the Lower Dam Recreation Area. Until the site plan is completed, the cost of renovation of the Lower Dam Recreation Area is unknown. At the bare minimum, the beach parking area and the road leading to it would need to be rehabilitated under any alternative that is selected.

Table C-6. New One-time Costs for Other Facilities ($ in thousands)

Other New Facilities	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
1 comfort station and 1 vault toilet	-	$208	$208	-	L
Lower Dam Recreation Area redesign site plan	$40	$40	$40	$40	H
Rehabilitation of beach access/parking	$50	$50	$50	$50	M
Total Other New Facilities	**$90**	**$298**	**$298**	**$90**	

Interpretive and Educational Projects. Changes to the general brochure would be required under all alternatives. It is anticipated that a new brochure would need to be created under all alternatives with changes needed to maps and text. If the old brochure can be reprinted with modifications under any of the alternatives, the cost may be reduced.

Table C-7. New One-time Costs for Interpretive and Educational Projects ($ in thousands)

Interpretive/ Educational Projects	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Wildlife webcam	-	$10	$10	$10	L
Refuge video	-	$30	$30	$30	L
General brochure	$3	$3	$3	$3	H
Total for Projects	**$3**	**$43**	**$43**	**$43**	

Fees. The upfront costs for a fee program include fee deposition containers (i.e., iron rangers) and fee collection envelopes. The Refuge considered providing an optional fee reduction program in Alternative 3. This program would consist of training about the Refuge and its wildlife. Participants would need to take and pass a post-training assessment to be provided a discounted entrance fee. Start-up costs for the fee reduction program would include computers and creation of the training and post-training assessment.

Table C-8. New One-time Costs for Fee Program ($ in thousands)

Fees	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Entrance fee	-	-	$22	-	L
Boat launch fee	-	-	$9	$9	L
Fee reduction program	-	-	$8	-	L
Total for Fees	**-**	**-**	**$39**	**$9**	

Wildlife Disturbance Reduction Signs. No-wake zones, closed areas, and/or seasonally closed areas are used to differing degrees to reduce disturbance to wildlife and habitats in every alternative. Signs providing a boundary of the zone or area, as well as information about why there is a restriction to access would need to be provided. All of the seasonal closures at Lake Lowell in Alternatives 3 and 4 are already accounted for in the buoys required for the closed areas. Given that the goose-nesting closure on the islands would continue, and that island signage is limited at this time, a cost associated with continuing the current closure is represented under Alternative 1. Table C-9 shows the costs associated with providing such signage under each alternative.

Table C-9. New One-time Costs for Wildlife Disturbance Reduction Signs ($ in thousands)

Signs	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Seasonal nesting closures at Lake Lowell Unit	-	$1	-	-	H
Seasonal nesting closures on Snake River Islands Unit	$5	$11	$11	$11	H
Wintering goose closure on Leavitt Tract	-	-	$1	$1	H
Total For Signs	**$5**	**$12**	**$12**	**$12**	

Wildlife Disturbance Reduction Buoys. The Refuge and Canyon County Sheriff's Office currently deploy approximately 90 to 95 buoys in Lake Lowell to demarcate no-wake zones, closed areas, and swimming areas. In the action alternatives, these buoys would be reconfigured. The number of buoys needed was originally calculated (in the CCP) based on the requirements of the Service Sign Manual. This manual requires signage every 0.25 mile. To increase the public's understanding of the new closures, the number of buoys needed was recalculated at one buoy for every 100-150 yards. Table C-10 displays the additional cost required to mark no-wake zones and closures (seasonal or permanent) every 100-150 yards under each alternative.

Table C-10. New One-time Costs for Wildlife Disturbance Reduction Buoys ($ in thousands)

Wildlife Disturbance Reduction Buoys	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Permanent no-wake zones, closed areas, seasonally closed areas and swimming areas.	-	$18	$13	$10	H
Total for Buoys	-	**$18**	**$13**	**$10**	

Law Enforcement and Safety. Many comments were provided to the Refuge about visitors not following regulations. This issue would also be addressed through costs discussed in the staffing section, but it is important to look at technologies that may also reduce the likelihood of illegal activity. Remote video cameras and electronic gates may allow the Refuge to decrease illegal activity, increase the ability of law enforcement personnel to catch those engaged in illegal activity, and provide unobstructed use of the Refuge during daylight hours. There is a history of illegal activity on the Refuge (see Chapter 5), and these activities are expected to continue into the future and perhaps even increase as the population surrounding the Refuge grows. Because of current and potential future illegal activities, the cost of technological solutions can be found under all alternatives. Because many of the illegal activities that occur in the uplands are related to nonwildlife-dependent activities (e.g., off-leash dog walking, partying), no cameras were factored into Alternative 4 because no nonwildlife-dependent activities would be allowed. The cost of electronic gates in Alternative 4 would also be less because Gotts Point would remain closed to vehicles.

Table C-11. New One-time Costs for Safety and Law Enforcement Improvements ($ in thousands)

Improved Safety and Law Enforcement	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Cameras	$2	$3	$3	-	L
Electronic gates	$25	$225	$225	$200	H
Total for Safety	**$27**	**$228**	**$228**	**$200**	

Research and Monitoring Related to Public Use. There are two different types of research and monitoring programs that are related to public use. The first provides feedback on the quality of public use opportunities, and the second studies whether or not our public use programs are compatible with the purpose of the Refuge. As was pointed out in many of the comments received during scoping for the CCP, Deer Flat NWR does not have on-site research showing the interaction of public use programs and wildlife. In order to remedy this lack and test whether our public use programs under each alternative can be provided without substantially impacting wildlife and habitat, disturbance studies must be conducted. Because we would need this information for the next CCP (scheduled to be completed in 15 years), these studies would be completed regardless of the alternative selected. Quality of public use programs is related to the program itself and the ways in which users impact each other. Many studies would not have large one-time costs associated with them and would be listed in the staffing needs section. The studies listed in Table C-12 are those that would be contracted to outside entities in the creation of the study protocols or the completion of the study itself.

Table C-12. New One-time Costs for Public Use Surveys and Research ($ in thousands)

Public Use Survey and Research Needs	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Study to assess disturbance to grebes, shorebirds, herons and landbirds at Lake Lowell (2-year study)	$140	$140	$140	$140	H
Quality of wildlife-dependent public uses	$75-$80	$75-$80	$75-$80	$75-$80	M
Total for Research and Monitoring	**$215-$220**	**$215-$220**	**$215-$220**	**$215-$220**	

Table C-13 summarizes the one-time costs that are needed to provide for public uses at Deer Flat NWR.

Table C-13. Summary of New One-time Costs Related to Public Use ($ in thousands)

	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Providing Recreation While Minimizing Impacts to Wildlife and Habitats				
Buoys	-	$18	$13	$10
Signs	$5	$12	$12	$12
Subtotal	**$5**	**$30**	**$25**	**$22**
Public Use Enhancements				
Boardwalk	-	-	$5,848	-
Trails and signs	$80	$436	$410	$262
Docks and blinds	$25	$193	$211	$130
Kiosks	-	$262	$262	$262
Environmental education and interpretation facilities	$624	$1,106	$1,106	$1,066

	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Other new facilities	$90	$298	$298	$90
Environmental education and interpretation projects	$3	$43	$43	$43
Subtotal	**$822**	**$2,338**	**$8,178**	**$1,853**
Establish a Fee Program				
Fee collection	-	-	$39	$9
Subtotal	**$0**	**$0**	**$39**	**$9**
Enhance Safety and Law Enforcement				
Technology	$27	$228	$228	$200
Subtotal	**$27**	**$228**	**$228**	**$200**
Studies, Research, and Monitoring Related to Public Uses				
Human-wildlife interaction	$140	$140	$140	$140
Quality of recreation	$75-$80	$75-$80	$75-$80	$75-$80
Subtotal	**$215-$220**	**$215-$220**	**$215-$220**	**$215-$220**
Total Public-use-related One-time Costs	**$1,069-$1,074**	**$5,477-$5,626**	**$8,685-$8,690**	**$2,299-$2,304**

C.2.3 New One-time Costs for Wildlife and Habitat Management

Habitat management can be achieved in a variety of ways, which makes estimating costs for individual projects difficult before a habitat management plan has been created. For example, the treatment of invasive species can be accomplished chemically (with herbicides), mechanically (e.g., mowing, discing, chipping), through the use of fire or goats, or by hand. Each of these different treatments requires different equipment and staffing to achieve. Because of the variety of ways that management can be accomplished, the costs listed in all of the tables below are estimates that would be refined as projects are planned and implemented.

Mudflats. Additional areas of mudflats would be created adjacent to current mudflats by removing vegetation removal through discing, burning, and or other mechanical control methods. Mudflats would be enhanced by using a disc to create scours that would hold pools of water. The projects would occur within the life of the CCP.

Table C-14. New One-time Costs for Mudflat-related Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Create and enhance mudflats	-	-	5-25	$1-$6	5-25	$1-$6	5-25	$1-$6	L
Total	**-**	**-**	**5-25**	**$1-$6**	**5-25**	**$1-$6**	**5-25**	**$1-$6**	

Riparian Areas at Lake Lowell. The fragmentation of the riparian zone would be reduced by relocating firebreaks so they coincide with Board of Control drainage and canals. The riparian areas would also be enhanced and maintained through the reduction of nondesirable plants; reduction of hazardous fuels; planting of desirable trees, shrubs and grasses (to replace nondesirables that are removed); and enhancements in nesting habitat. Because these enhancement goals can be attained through numerous means (e.g., prescribed fire, herbicide, mechanical removal), the actual costs of riparian enhancement would differ depending on the tools that are used. The estimates below reflect some of the most expensive methods in order to capture the highest estimated costs. The projects would occur throughout the life of the CCP.

Table C-15. New One-time Costs for Lake Lowell Riparian-related Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Remove undesirable vegetation	-	-	1,200	$210	1,200	$210	1,200	$210	H
Plant desirable vegetation	-	-	10-15	$5-$7	10-15	$5-$7	10-15	$5-$7	H
Relocate fire breaks	-	-	100	$18	100	$18	100	$18	M
Total		**-**		**$233-$235**		**$233-$235**		**$233-$235**	

Riparian Areas at Snake River Islands. The size of the islands within the Snake River Islands Unit varies from 1 acre to 40 acres. Because the prioritization of island enhancement and protection would occur after the CCP is completed, an average size of 20 acres was used to create the cost estimates in Table C-16. The same theory was used for fencing of islands and adjacent lands. An average shoreline size was established and used to create the cost estimates. The projects would occur over the life of the CCP.

Table C-16. New One-time Costs for Snake River Islands Riparian-related Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	#of Islands	Cost	# of Islands	Cost	# of Islands	Cost	# of Islands	Cost	
Remove undesirable vegetation and plant desirable vegetation	-	-	2-10	$60-$300	2-10	$60-$300	2-10	$60-$300	H
Reduce cattle trespass	-	-	2-10	$6-$30	2-10	$6-$30	2-10	$6-$30	M
Total	-	-	**2-10**	**$66-$330**	**2-10**	**$66-$330**	**2-10**	**$66-$330**	

Wetlands. Emergent wetlands would be enhanced through removal of undesirable vegetation, planting of desirable vegetation, and recontouring. Because some of these enhancement goals can be attained through numerous means (e.g., prescribed fire, herbicide, mechanical removal), the actual costs of enhancement would differ depending on the tools that are utilized. The estimates below used some of the most expensive methods in order to capture the highest estimated costs. The projects would occur throughout the life of the CCP.

Table C-17. New One-time Costs for Wetlands-related Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Remove undesirable vegetation	-	-	82	$18	82	$18	82	$18	M
Plant desirable vegetation	-	-	82	$25	82	$25	82	$25	M
Re-contour wetlands	-	-	82	$7	82	$7	82	$7	L
Total	-	-	**82**	**$50**	**82**	**$50**	**82**	**$50**	

Shrub-steppe Habitat at Lake Lowell. Shrub-steppe habitat would be enhanced through removal of undesirable vegetation, planting of desirable vegetation, and removal of unnecessary internal firebreaks. Because some of these enhancement goals can be attained through numerous means (e.g., prescribed fire, herbicide, mechanical removal), the actual costs of enhancement would differ depending on the tools that are utilized. The estimates below used some of the most expensive methods in order to capture the highest estimated costs. The projects would occur throughout the life of the CCP.

Table C-18. New One-time Costs for Lake Lowell Shrub-Steppe-related Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Remove undesirable vegetation	-	-	300	$38	300	$38	300	$38	H
Plant desirable vegetation	-	-	150	$36	150	$36	150	$36	H
Remove unnecessary internal firebreaks	-	-	4	$1	4	$1	4	$1	M
Total	-	-		**$75**		**$75**		**$75**	

Shrub-steppe Habitat at Snake River Islands. The size of the islands within the Snake River Islands Unit varies from 1 acre to 40 acres. Because the prioritization of island enhancement and protection would occur after the CCP is completed, an average size of 20 acres was used to create the cost estimates in Table C-19. The projects would occur over the life of the CCP.

Shrub-steppe habitat would be enhanced through removal of undesirable vegetation, planting of desirable vegetation, and removal of unnecessary internal firebreaks. Because some of these enhancement goals can be attained through numerous means (e.g., prescribed fire, herbicide, mechanical removal), the actual costs of enhancement would differ depending on the tools that are utilized. The estimates below used some of the most expensive methods in order to capture the highest estimated costs. The projects would occur throughout the life of the CCP.

Table C-19. New One-time Costs for Snake River Islands Shrub-steppe-related Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Remove undesirable vegetation	-	-	40-200	$14-$70	40-200	$14-$70	40-200	$14-$70	H
Plant desirable vegetation	-	-	40-200	$60-$300	40-200	$60-$300	40-200	$60-$300	H
Total	-	-	**40-200**	**$74-$370**	**40-200**	**$74-$370**	**40-200**	**$74-$370**	

Agriculture. Enhancement of the agricultural program would occur through installation of a new well, creating better growing conditions.

Table C-20. New One-time Costs for Agricultural Projects ($ in thousands)

Project	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Install well	-	$80-$100	$80-$100	$80-$100	L
Total	-	**$80-$100**	**$80-$100**	**$80-$100**	

Grasslands. Maintenance of the goose browse in the Leavitt Tract would occur through updates to the irrigation system and re-establishment of goose pasture. Efficient and effective irrigation is also an important part of the cooperative land management program at Lake Lowell Unit. In order to provide an adequate amount of water to the Refuge's managed grasslands the irrigation system would need to be improved.

Table C-21. New One-time Costs for Grasslands Projects ($ in thousands)

Project	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Update irrigation		-		$12		$12		$12	M
Interseed grass	-	-	80	$48	80	$48	80	$48	M
Total		**-**		**$60**		**$60**		**$60**	

Research, Surveys, and Assessments of Wildlife and Habitat. Table C-22 provides costs for research, surveys, and assessments that would accomplished through the use of contractors. It is important to understand the baseline structure of habitats and wildlife so that future changes can be monitored.

Table C-22. New One-time Costs for Surveys and Research ($ in thousands)

Public Use Survey and Research Needs	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Prioritization of Refuge islands for wildlife value	-	$30	$30	$30	H
Analyze historic biological data to assess long-term population trends	-	$30	$30	$30	M
Contaminants study of DDT in Lake Lowell	-	$250	$250	$250	M
Contaminants investigation of Leavitt Tract	-	$200	$200	$200	M
Mule deer study at Lake Lowell Unit (3-year vegetation and population study)	-	$60	$60	$60	M
Mule deer study at Snake River Islands Unit (3-year vegetation and population study)	-	$80	$80	$80	M
Cheatgrass removal study (4 years of study and monitoring)	-	$110	$110	$110	H
Soil survey of shrub-steppe and GIS layer	-	$40	$40	$40	M
Surveys of wetland topography	-	$20	$20	$20	M
Total for Research and Monitoring	-	**$820**	**$820**	**$820**	

Table C-23 summarizes the one-time costs that are needed to provide for public uses at Deer Flat NWR.

Table C-23. Summary of New One-time Costs Related to Wildlife and Habitat Management ($ in thousands)

	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Enhance Habitat				
Mudflats	-	$1-6	$1-6	$1-6
Riparian at Lake Lowell	-	$233-$235	$233-$235	$233-$235
Riparian at Snake River Islands	-	$66-$330	$66-$330	$66-$330
Wetlands	-	$50	$50	$50
Shrub-steppe at Lake Lowell	-	$75	$75	$75
Shrub-steppe at Snake River Islands	-	$74-$370	$74-$370	$74-$370
Agriculture	-	$80-$100	$80-$100	$80-$100
Grasslands	-	$60	$60	$60
Subtotal	-	**$639-$1,226**	**$639-$1,226**	**$639-$1,226**
Studies, Research, and Monitoring				
Wildlife and habitat research	-	$820	$820	$820
Subtotal	-	**$820**	**$820**	**$820**
Total Wildlife and Habitat Management One-time Costs	-	**$1,459-$2,046**	**$1,459-$2,046**	**$1,459-$2,046**

C.2.4 Summary of One-time Costs

Table C-24. Summary of One-time Costs ($ in thousands)

Cost Category	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
	Cost Per Year	Cost Per Year	Cost Per Year	Cost Per Year
Public use	$1,069-$1,074	$2,798-$2,803	$8,672-$8,677	$2,289-$2,294
Wildlife and habitat	-	$1,459-$2,046	$1,459-$2,046	$1,459-$2,046
Total One-time Costs	**$1,069-$1,074**	**$4,257-$4,849**	**$10,131-$10,723**	**$3,748-$4,340**

C.2.5 Nonstaff Recurring Costs Related to Public Use

Facilities: Trails, Boardwalk, Kiosks, Blinds, Environmental Education and Interpretation Facilities, and Other Facilities (costs for maintaining docks are discussed under Buoys, Docks, and Signs). With new trails, signs, and other public use facilities comes an increase in associated maintenance and operations. The following are estimated maintenance costs per year for the new trails. In Fiscal Year (FY) 2011, approximately $28,000 was spent on maintaining Refuge buildings. It is estimated that $10,000 per year is spent to maintain the current trail system (including herbicide treatment, grading, and adding gravel), the observation blind, and platforms. Special maintenance projects in 2011 on the Kingfisher Trail and the observation blind cost the Refuge an additional $10,000. These expenditures were used as a baseline to estimate new funding needs for the maintenance of new facilities proposed under each alternative. If the visitor contact station replaces the Environmental Education Building, the cost of building maintenance should not rise. Because the maintenance costs for a wooden boardwalk may exceed those for a gravel trail, extra funding was added to Alternative 3.

The Refuge currently pays for waste removal in the Gotts Point and Upper Dam Recreation Area vault toilets. These vault toilets are currently only pumped, on average, once every two years.

Visitors have complained about the condition of restrooms, which may be alleviated, in part, by monthly pumping. Therefore, monthly pumping, from April through September, has been factored into all alternatives. The Canyon County Parks, Recreation, and Waterways maintains the vault toilets in the Lower Dam Recreation Area. If Canyon County decided not to continue maintenance at the Lower Dam Recreation Area, the cost for restroom maintenance would rise.

Table C-25. New Recurring Costs for Facilities ($ in thousands)

Facilities	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
		Cost	Cost	Cost	Cost	
Utilities	Every year	-	$2	$2	$2	M
Restroom maintenance	Every year	$2	$3	$3	$2	L
Other facilities maintenance	Every year	$1	$4	$5	$3	M
Dog feces disposal bags	Every year	$1	$1	-	-	H
Total	**Every year**	**$4**	**$10**	**$10**	**$7**	

Buoys, Docks and Signs. Due to vandalism, theft, and normal wear and tear, a percentage of the Refuge's signs and buoys would have to be replaced annually. It was estimated that 25 percent of the regulation and directional signs would need to be replaced yearly and that half of the interpretive signs would need to be replaced during the life of the CCP. According to the Canyon County Sheriff's office, between $10,000 and $20,000 per year is spent on maintaining the current boat launching docks and buoys on the Refuge. The additional funds needed to maintain new buoys and docks were estimated based on an average annual maintenance cost of $15,000 for the six docks that are currently maintained by Canyon County. Two other docks that are currently maintained by the Refuge are already maintained with base funding. The funding needed to maintain the current docks would increase if Canyon County discontinued the maintenance of the current boating docks. Table C-26 captures this cost.

Table C-26. New Recurring Costs for Buoys, Docks, and Signs ($ in thousands)

Buoys, Docks, and Signs	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
		Cost	Cost	Cost	Cost	
Buoy and dock maintenance	Every year	-	$7	$10	$7	H
Replace 25% of regulatory and directional signs	Every year	$2	$5	$3	$3	H
Replace 50% of interpretive signs	Every 10 years	$19	$56	$52	$41	M
Total	**Every year**	**$2**	**$12**	**$13**	**$10**	
Total	**Every 10 years**	**$19**	**$56**	**$52**	**$41**	

Environmental Education and Interpretation Projects. Many of the recurring costs are above and beyond the current base budget even though they are happening currently, because they have been funded by grants. These grants cannot be counted on, so these costs must be accounted for in recurring costs to continue the upkeep of the program or project. Costs include but are not restricted to printing of materials, equipment, volunteer awards, scholarships for buses, and presenter costs.

Table C-27. Recurring Costs for New Environmental Education and Interpretation Projects ($ in thousands)

Project	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
		Cost	Cost	Cost	Cost	
Teach the teacher	Every year	-	$1	$1	$1	M
EE program	Every year	$4	$4	$4	$4	M
Volunteers	Every year	-	$1	$1	-	H
On-site events	Every year	-	$2	$2	$1	H
Webcam	Every year	$1	$1	$1	$1	L
Brochure reprint	Every 3 years	$3	$3	$3	$3	H
Total	**Every year**	**$5**	**$9**	**$9**	**$7**	
Total	**Every 3 years**	**$3**	**$3**	**$3**	**$3**	

Fees. In order to collect fees at multiple entrances, envelopes and self-service fee stations must be provided. Once in place, the fee stations (i.e., iron rangers) require little maintenance or upkeep. However, envelopes are disposable items, and a new envelope must be used for each visit. The cost of printing envelopes for approximately 200,000 visitors is displayed in Table C-28.

Table C-28. Recurring Costs for New Fee Programs ($ in thousands)

Fees	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
		Cost	Cost	Cost	Cost	
Fee envelopes	Every year	-	-	$45	$13	L
Total	**Every year**	**-**	**-**	**$45**	**$13**	

Controlled Waterfowl Hunt. Depending on the type of controlled hunt employed, the program could have staffing or materials costs associated with it. In order to create a fee system that would not depend on a staff member, a self-check system would be employed. If the hunt program used a check-in/out system, then envelopes and iron rangers would be used, much like the fee program explained above.

Table C-29. New Recurring Costs for Hunting Programs ($ in thousands)

Controlled Hunt	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
		Cost	Cost	Cost	Cost	
Envelopes	Every 3 years	-	-	**$1**	-	L
Total	**Every 3 years**	**-**	**-**	**$1**	**-**	

Table C-30 summarizes the recurring costs that are needed to provide for public uses at Deer Flat NWR.

Table C-30. Summary of New Recurring Costs Related to Public Use ($ in thousands)

Public Use Recurring Costs	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
		Cost	Cost	Cost	Cost
Buildings and trail maintenance	Every year	$4	$10	$10	$7
Signs, docks and buoy, maintenance	Every year	$2	$12	$13	$10

Public Use Recurring Costs	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
		Cost	Cost	Cost	Cost
Environmental education, volunteers, and interpretation	Every year	$5	$9	$9	$7
Fees	Every year	-	-	$45	$13
Brochures	Every 3 years	$3	$3	$3	$3
Controlled hunt	Every 3 years	-	-	$1	-
Interpretive signs	Every 10 years	$19	$56	$52	$41
Total	**Every year**	**$11**	**$31**	**$77**	**$37**
Total	**Every 3 years**	**$3**	**$3**	**$4**	**$3**
Total	**Every 10 years**	**$19**	**$56**	**$52**	**$41**

C.2.6 Nonstaff Recurring Costs Related to Wildlife and Habitat Management

As explained in Section C.2.3 New One-time Costs for Wildlife and Habitat Management, habitat management can be achieved in a variety of ways, which makes estimating costs difficult before a habitat management plan has been created. The costs listed below are estimates based on the most expensive method of treatment. Because the most expensive method of treatment was used to estimate cost, the actual cost of implementation should be lower. These costs would be refined as projects are planned and implemented.

Emergent Beds. Enhancement of emergent habitat would occur through soil disturbance, invasive species control, and the seeding/planting of moist soil plants. These efforts are above and beyond invasive species control that is currently occurring and accounted for in Section C.2.1 One-time and Recurring Costs Common to All Alternatives.

Table C-31. New Recurring Costs for Emergent-bed Habitat Projects ($ in thousands)

Project	Timing	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
		Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Maintain and enhance emergent beds	Every year	-	-	20	$4	20	$4	20	$4	H
Total	**Every year**	**-**	**-**	**20**	**$4**	**20**	**$4**	**20**	**$4**	

Shrub-steppe Habitat at Lake Lowell. Shrub-steppe habitat would be maintained through removal of undesirable vegetation in areas that have been restored. The costs estimated below would not be realized until after an area has been rehabilitated. Cost estimates are based on having to use herbicide to control nondesirable species on 25 percent of the total restored acreage each year. The per-year estimate would be excessive, because the entire 300 acres would not be restored within the first year.

Table C-32. New Recurring Costs for Lake Lowell Shrub-steppe Habitat Projects ($ in thousands)

Project	Timing	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
		Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Remove undesirable vegetation	Every year	-	-	75	$23	75	$23	75	$23	H
Total	**Every year**	-	-	**75**	**$23**	**75**	**$23**	**75**	**$23**	

Shrub-steppe Habitat at Snake River Islands. Shrub-steppe habitat would be maintained through removal of undesirable vegetation in areas that have been restored. The costs estimated below would not be realized until after an area has been rehabilitated. Cost estimates are based on having to use herbicide to control nondesirable species on 25 percent of the total restored acreage each year. The per-year estimate would be excessive, because the entire 40 to 200 acres would not be restored within the first year. Costs per acre are more expensive for shrub-steppe maintenance on the islands because of the logistical challenges in bringing herbicide to the islands.

Table C-33. New Recurring Costs for Snake River Islands Shrub-steppe Habitat Projects ($ in thousands)

Project	Timing	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
		Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Remove undesirable vegetation	Every year	-	-	10-50	$4-$18	10-50	$4-$18	10-50	$4-$18	H
Total	**Every year**	**-**	**-**	**10-50**	**$4-$18**	**10-50**	**$4-$18**	**10-50**	**$4-$18**	

Agriculture. Enhancement of the agricultural program would include annual planting of crops along the shoreline of the lake. Because the cost of the new plantings would vary depending on the type of crop that is planted, the most expensive crops were used for the estimate in order to capture the highest estimated cost.

Table C-34. New Recurring Costs for Agricultural Projects ($ in thousands)

Project	Timing	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
		Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Plant crops on shoreline	Every year	-	-	25	$7	25	$7	25	$7	L
Total	**Every year**	**-**	**-**	**25**	**$7**	**25**	**$7**	**25**	**$7**	

Grasslands. Maintenance of desirable short grasses for goose browse in the Leavitt Tract would occur through the use of prescribed fire, herbicide, and/or mechanical control. The actual costs of maintenance would differ depending on the tools that are utilized. The estimates below used some of the most expensive methods in order to capture the highest estimated costs. The projects would occur throughout the life of the CCP.

Table C-35. New Recurring Costs for Grasslands Projects ($ in thousands)

Project	Timing	Alternative 1 (Status Quo)		Alternative 2 (Preferred)		Alternative 3		Alternative 4		Priority
		Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	
Manage short grasses	Every year	-	-	80	$12	80	$12	80	$12	M
Total	**Every year**	**-**	**-**	**80**	**$12**	**80**	**$12**	**80**	**$12**	

Table C-36 summarizes the recurring costs that are needed to implement new wildlife and habitat maintenance projects at Deer Flat NWR.

Table C-36. Summary of New Recurring Costs Related to Wildlife and Habitat Management ($ in thousands)

Projects Maintaining Wildlife Habitats	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
		Cost	Cost	Cost	Cost
Emergent beds	Every year	-	$4	$4	$4
Shrub-steppe at Lake Lowell Unit	Every year	-	$23	$23	$23
Shrub-steppe at Snake River Islands Unit	Every year	-	$4-$18	$4-$18	$4-$18
Agriculture	Every year	-	$7	$7	$7
Grasslands	Every year	-	$12	$12	$12
Total	**Every year**	**-**	**$50-$64**	**$50-$64**	**$50-$64**

C.2.7 Summary of All Recurring Costs

Table C-37. Summary of Recurring Costs ($ in thousands)

Recurring Costs	Timing	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
		Cost	Cost	Cost	Cost
Public use	Every year	$11	$31	$77	$37
Public use	Every 3 years	$3	$3	$4	$3
Public use	Every 10 years	$19	$56	$52	$41
Wildlife and habitat	Every year	-	$50-$64	$50-$64	$50-$64
Total	**Every year**	**$11**	**$81-$95**	**$127-$141**	**$87-$101**
Total	**Every 3 years**	**$3**	**$3**	**$4**	**$3**
Total	**Every 10 years**	**$19**	**$56**	**$52**	**$41**

C.2.8 Staffing Costs

Table C-38. Current Permanent Staffing ($ in thousands)

Staff: Refuge Operations	Status	Series, Position, and Grade
Refuge Manager	PFT	GS-0485-12
Assistant Refuge Manager	PFT	GS-0485-11
Visitor Services Manager	PFT	GS-0025-11
Wildlife Biologist	PFT	GS-0486-09
Maintenance Worker	PFT (vacant)	WG-4749-08
Administrative Assistant	PFT (vacant)	WG-0303-06
Total Positions and Salary	**6**	**$448**

Table C-39. Current Temporary Staffing ($ in thousands)

Staff: Refuge Operations	Status	Series, Position, and Grade
Office Aide	STEP	GS-0303-4
Youth Conservation Corps Leader	TEMP	GS-0186-05
Youth Conservation Corps	TEMP	Minimum wage
Youth Conservation Corps	TEMP	Minimum wage
Youth Conservation Corps	TEMP	Minimum wage
Youth Conservation Corps	TEMP	Minimum wage
Total Positions and Salary	**6**	**$47**

Table C-40. Current Operations Funded Interns ($ in thousands)

Interns	Status	Series, Position, and Grade
Environmental Education Specialist	TERM	Intern
Volunteer Coordinator	TERM	Intern
Biological Science Technician	SEASONAL	Intern
Total Positions and Salary	**3**	**$30**

Table C-41. Additional Staff Needed to Implement CCP ($ in thousands)

Staff: Refuge Operations	Status	Series, Position, and Grade
*Biological Science Technician	PFT	GS-0400-07
*Environmental Education Specialist	PFT	GS-1750-07
*Volunteer Coordinator	PFT	GS-0025-07
Law Enforcement Officer	PFT	GS-0025-09
Total Positions and Salary	**4**	**$217**

***If these positions were funded, the current interns would not be necessary.

C.3 Step-down Plans

The CCP is one of several plans necessary for Refuge management. The CCP provides guidance in the form of goals, objectives, and strategies for several Refuge program areas but may lack some of the specifics needed for implementation. Step-down management plans would be developed for individual program areas within approximately five years after the CCP's completion. All step-down plans require appropriate National Environmental Policy Act (NEPA) compliance, and implementation may require additional permits. Step-down plans for the Refuge follow. Project-specific plans, with appropriate NEPA compliance, may be prepared outside of these step-down plans.

Table C-42. Status of Step-down Plans

Step-down Plans	Status
Safety Plan	Revised 2012
Integrated Pest Management Plan	Created 2012, included as CCP Appendix G
Fire Management Plan	Revised 2012, included as CCP Appendix K
Habitat Management Plan	Within 2 years of CCP completion
Visitor Services Plan	Within 5 years of CCP completion
Fisheries Management Plan	Within 5 years of CCP completion
Inventory and Monitoring Plan	Within 2 years of CCP completion
Hunt Plan(s) for new hunts	Within 3 years of CCP completion

Document continues on next page.

Appendix D. Wilderness Review

D.1 Introduction

The Deer Flat National Wildlife Refuge (Refuge) comprises two units, the 10,500-acre Lake Lowell Unit, which includes the 9,000-acre Lake Lowell, and the Snake River Island Unit, which comprises 104 islands totaling about 1,060 acres (as calculated using GIS). The islands stretch along the Snake River for 113 river miles in Idaho and Oregon.

The Lake Lowell Unit supports several habitat types including riparian forest, shrub-steppe, and managed agricultural lands. Lake Lowell itself is an irrigation project managed by the Bureau of Reclamation, which operates the lake's water for agricultural purposes; the U.S. Fish and Wildlife Service (Service) manages the surface uses. The Snake River islands also support riparian and shrub-steppe/grassland habitats. Both units of the Refuge receive substantial and varied public use, while the islands are further influenced by river traffic, including all types of recreational boating.

D.2 Policy and Direction for Wilderness Reviews

Service policy (602 FW 3.4 C.(1)(c)) requires that wilderness reviews be completed as part of the comprehensive conservation planning process. This review includes the re-evaluation of Refuge lands existing during the initial 10-year review period of the Wilderness Act of 1964, as amended (16 U.S. Code [U.S.C.] 1131-1136), as well as new lands and waters added to the National Wildlife Refuge System (NWRS) since 1974. A preliminary inventory of the wilderness resources is to be conducted during pre-acquisition planning for new or expanded refuges (341 FW 2.4 B., Land Acquisition Planning). NWRS policy on Wilderness Stewardship (610 FW 1-5) includes guidance for conducting wilderness reviews (610 FW 4, Wilderness Review and Evaluation).

A wilderness review is the process of determining whether the Service should recommend NWRS lands and waters to U.S. Congress for wilderness designation. The wilderness review process consists of three phases: wilderness inventory, wilderness study, and wilderness recommendation.

D.2.1 Wilderness Inventory

The inventory is a broad look at a refuge to identify lands and waters that meet the minimum criteria for wilderness: size, naturalness, and outstanding opportunities for solitude or primitive and unconfined type of recreation. All areas meeting the criteria are preliminarily classified as Wilderness Study Areas (WSAs). If WSAs are identified, the review proceeds to the study phase.

D.2.2 Wilderness Study

During the study phase, WSAs are further analyzed

- For all ecological, recreational, cultural, economic, and symbolic values;
- For all resources, including wildlife, vegetation, water, minerals, and soils;
- For existing and proposed public uses;
- For existing and proposed refuge management activities within the area; and

- To assess the refuge's ability to manage and maintain the wilderness character in perpetuity, given the current and proposed management activities. Factors for evaluation may include, but are not limited to, staffing and funding capabilities, increasing development and urbanization, public uses, and safety.

We evaluate at least an All Wilderness Alternative and a No Wilderness Alternative for each WSA to compare the benefits and impacts of managing the area as wilderness as opposed to managing the area under an alternate set of goals, objectives, and strategies that do not involve wilderness designation. We may also develop Partial Wilderness Alternatives that evaluate the benefits and impacts of managing portions of a WSA as wilderness.

In the alternatives, we evaluate:

- The benefits and impacts to wilderness values and other resources;
- How each alternative will achieve the purposes of the Wilderness Act and the NWRS;
- How each alternative will affect achievement of refuge purpose(s) and the refuge's contribution toward achieving the Refuge System mission;
- How each alternative will affect maintenance and, where appropriate, restoration of biological integrity, diversity, and environmental health at various landscape scales;
- Other legal and policy mandates; and
- Whether a WSA can be effectively managed as wilderness by considering the effects of existing private rights, land status and service jurisdiction, refuge management activities and refuge uses, and the need for or possibility of eliminating Section 4(c) prohibited uses.

D.2.3 Wilderness Recommendation

If the wilderness study demonstrates that a WSA meets the requirements for inclusion in the National Wilderness Preservation System, a wilderness study report should be written that presents the results of the wilderness review, accompanied by a Legislative Environmental Impact Statement (LEIS). The wilderness study report and LEIS that support wilderness designation are then transmitted through the Secretary of the Interior to the President of United States, and ultimately to the U.S. Congress for action. Refuge lands recommended for wilderness consideration by the wilderness study report would retain their WSA status and be managed as "wilderness according to the management direction in the final CCP [comprehensive conservation plan] until Congress makes a decision on the area or we amended the CCP to modify or remove the wilderness recommendation" (610 FW 4.22 B). When a WSA is revised or eliminated, or when there is a revision in "wilderness stewardship direction, we include appropriate interagency and tribal coordination, public involvement, and documentation of compliance with NEPA [National Environmental Policy Act]" (610 FW 3.13).

The following constitutes the inventory phase of the wilderness review for Deer Flat National Wildlife Refuge.

D.3 Previous Wilderness Review

On June 21, 1972, the Director of the Bureau of Sport Fisheries and Wildlife sent a cover memo, draft wilderness study report, and mock-up brochure with a map to the Assistant Secretary of Fish, Wildlife, and Parks. The memo states that, with the Assistant Secretary's concurrence, the Bureau

would conduct a public hearing recommending that 68 islands, constituting approximately 734 acres within the Snake River Unit of the Deer Flat National Wildlife Refuge, qualify for wilderness designation within the National Wilderness Preservation System. (At the time the memo was written, the Snake River Islands Unit included 73 islands along 110 miles of the lower Snake River.) The Assistant Secretary signed his concurrence on June 21, 1972.

The draft wilderness study report, titled "Snake River Islands Wilderness Proposal, Snake River Unit, Deer Flat National Wildlife Refuge, Idaho-Oregon," states:

> This report was prepared pursuant to the Wilderness Act, Public Law 88-577. Publication of the findings and recommendation herein should not be construed as representing either the approval or disapproval of the Secretary of the Interior. The purpose of this report is to provide information and alternatives for further consideration by the Bureau of Sport Fisheries and Wildlife, Secretary of the Interior, and other Federal agencies.

The draft wilderness study report states in its conclusion:

> These refuge islands are mostly undeveloped and appear to be largely unaffected by man's works. However, the bordering riverbanks and adjacent lands are developed and intensively cultivated. Few islands are out of sight of some sort of man-made disturbance. Developments include irrigation pumping stations, power lines, towns, bridges, industrial plants, farm buildings and feed lots which in many cases extend to the water's edge. Since the river is relatively narrow with many of the islands in close proximity to the shore, man's presence is clearly visible and his activity can be heard from nearly every island in the complex. Hence the opportunity for solitude is diminished, yet the value of these islands as wilderness is not invalidated by sights and sounds from outside the proposed wilderness. Rather the value of these islands is commensurately enhanced by their mere existence amidst an area where man and his works dominate the landscape. Therefore, 68 islands containing approximately 734 acres in the Snake River Unit of the Refuge are considered suitable for inclusion in the National Wilderness Preservation System.

Now, more than 16 years later, during the December 2008 preplanning phase of the Deer Flat National Wildlife Refuge CCP, the Service conducted a wilderness review of Refuge lands at Deer Flat, both the Lake Lowell and Snake River Units, including re-evaluating the findings and conclusions of the 1972 draft wilderness study report.

D.4 Lands Considered Under This Wilderness Review

All Service-owned lands and waters within the Deer Flat National Wildlife Refuge–approved boundary were considered during this review of potential wilderness areas. For purposes of the review, the Refuge's two units are analyzed separately: (1) the Lake Lowell Unit and (2) the Snake River Unit, including 104 islands (1,200 acres) along 113 river miles from the Canyon-Ada County line, Idaho, to Farewell Bend, Oregon

D.5 Wilderness Inventory

D.5.1 Criteria for Evaluating Lands for Possible Inclusion in the National Wilderness Preservation System

The Wilderness Act of 1964, as amended (16 U.S.C. 1131-1136), provides the following description of wilderness:

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act as an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions.

The following criteria for identifying areas as wilderness are outlined in Section 2(c) of the Wilderness Act and are further expanded upon in NWRS policy (610 FW 4). The first three criteria are evaluated during the inventory phase; the fourth criterion is evaluated during the study phase.

- Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- Has at least five thousand acres of land or is of a sufficient size as to make practicable its preservation and use in an unimpaired condition; and
- May also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

Criterion 3 is further defined in Section 3(c) of the Wilderness Act as (1) a roadless area of 5,000 contiguous acres or more, or (2) a roadless island. "Roadless" is defined as the absence of improved roads suitable and maintained for public travel by means of four-wheeled, motorized vehicles that are intended for highway use.

D.5.2 Process of Analysis

The following evaluation process was used in identifying the suitability of Refuge units for wilderness designation:

- Determination of Refuge unit sizes;
- Assessment of the units' capacity to provide opportunities for solitude or primitive and unconfined recreation; and
- Assessment of "naturalness" of Refuge units.

More detail on the actual factors considered and used for each assessment step follows.

D.5.2.1 Unit Size

Roadless areas meet the size criteria if any one of the following standards applies:

- An area with over 5,000 contiguous acres solely in the Service's ownership.
- A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or an area that is markedly distinguished from the surrounding lands by topographical or ecological features.
- An area of less than 5,000 contiguous Federal acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- An area of less than 5,000 contiguous Federal acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the Forest Service, National Park Service, or Bureau of Land Management.

D.5.2.2 Outstanding Solitude or Primitive or Unconfined Recreation

A designated wilderness area must provide outstanding opportunities for solitude, or a primitive and unconfined type of recreation. Possession of only one of these outstanding opportunities is sufficient for an area to qualify as wilderness, and it is not necessary for one of these outstanding opportunities to be available on every acre. Furthermore, an area does not have to be open to public use and access to qualify under these criteria.

Opportunities for solitude refer to the ability of a visitor to be alone and secluded from other visitors in the area. Primitive and unconfined recreation means nonmotorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport. Primitive recreation activities may provide opportunities to experience challenge and risk, self-reliance, and adventure.

D.5.2.3 Naturalness and Wildness

The naturalness and wildness criterion states that the area must generally appear to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable. This criterion must be evaluated in the context of current natural conditions and societal values and expectations without compromising the original intent of the Wilderness Act. It is well recognized that there are few areas remaining on the planet that could be truly classified as primeval or pristine, with even fewer, if any, existing in the conterminous United States. Likewise, few areas exist that do not exhibit some impact from anthropogenic influences, be it noise, light, or air pollution; water quality or hydrological manipulations; past and current land management practices; road or trails; suppression of wildfires; invasions by nonnative species of plants and animals; or public uses. While allowing for the near-complete pervasiveness of modern society on the landscape, the spirit of the Wilderness Act is to protect lands that still retain the wilderness qualities of (1) natural, (2) untrammeled, and (3) undeveloped. These three qualities are cornerstones of wilderness character. For areas proposed or designated as wilderness, wilderness character must be monitored to determine baseline conditions and must thereafter be periodically monitored to assess the condition of these wilderness qualities. Proposed and designated wilderness areas by law and policy are required to maintain wilderness character through management and/or restoration in perpetuity.

Defining the first two qualities (natural and untrammeled) requires a knowledge and understanding of the ecological systems that are being evaluated as potential wilderness. Ecological systems have three primary attributes—composition, structure, and function. Composition refers to the components that make up an ecosystem, such as the habitat types, native species of plants and animals, and

abiotic (physical and chemical) features. These contribute to the diversity of the area. Structure is the spatial arrangement of the components that contributes to the complexity of the area. Composition and structure are evaluated to determine the naturalness of the area. Function refers to the processes that result from the interaction of the various components both temporally and spatially, and the disturbance processes that shape the landscape. These processes include but are not limited to predator-prey relationships, insect and disease outbreaks, nutrient and water cycles, decomposition, fire, wind storms, flooding, and both general and cyclic weather patterns. Ecological functions are evaluated to determine the wildness or untrammeled quality of the area.

The third quality assessment is whether an area is undeveloped. Undeveloped refers to the absence of permanent structures such as roads, buildings, dams, fences, and other human-made alterations to the landscape. Exceptions can be made for historic structures or structures required for safety or health considerations, providing they are made of natural materials and are relatively unobtrusive on the landscape.

General guidelines used for evaluating areas for wilderness potential during this wilderness inventory process include:

- The area should provide a variety of habitat types and associated abiotic features, as well as a nearly complete complement of native plants and wildlife indicative of those habitat types. Nonnative and invasive species should constitute a negligible portion of the landscape.
- The area should be spatially complex (vertically and/or horizontally) and exhibit all levels of vegetation structure typical of the habitat type, have an interspersion of these habitats, and provide avenues for plant and wildlife dispersal.
- The area should retain the basic natural functions that define and shape the associated habitats, including but not limited to flooding regimes, fire cycles, unaltered hydrology and flowage regimes, and basic predator-prey relationships including herbivory patterns.
- Due to their size, islands may not meet the habitat guidelines in the first two points above. Islands should, however, exhibit the natural cover type with which they evolved, and should continue to be shaped and modified by natural processes. Islands should be further analyzed during the study portion of the review, if they provide habitat for a significant portion of a population or key life cycle requirements for any resources of concern or listed species.
- Potential wilderness areas should be relatively free of permanent structures or human-made alterations. Areas may be elevated to the study phase if existing structures or alterations can be removed or remediated within a reasonable time frame, and prior to wilderness recommendation to the Secretary of the Interior.

D.5.2.4 Supplemental Values

The Wilderness Act states that an area of wilderness may contain ecological, geological, or other features of scientific, educational, scenic, or historical value. Supplemental values of the area are optional, but the degree to which their presence enhances the area’s suitability for wilderness designation should be considered. The evaluation should be based on an assessment of the estimated abundance or importance of each of the features.

D.6 Inventory Summary and Conclusion

Based on this inventory, the Lake Lowell Unit does not meet any of the basic criteria for inclusion in the National Wilderness Preservation System. The islands within the Snake River Unit meet the size criterion but do not meet the criteria for naturalness and wildness, nor do they provide outstanding opportunities for solitude or primitive or unconfined recreation. Based on this summary and conclusion, further evaluation of these lands under the wilderness study phase is unwarranted. Table D-1 summarizes the evaluation and conclusion for each unit.

Table D-1. Results of Wilderness Inventory for Deer Flat National Wildlife Refuge

Refuge Unit	Lake Lowell Unit	Snake River Islands Unit
(1) Unit Size: has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unconfined condition, or is a roadless island	No	Yes
(2) Naturalness and wildness: generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable	No	No
(3a) Outstanding opportunities for solitude	No	No
(3b) Outstanding opportunities for primitive and unconfined recreation	No	No
(4) Contains ecological, geological, or other features of scientific, educational, scenic, or historical value	N/A	N/A
Area qualifies as a wilderness study area (meets Criteria 1,2, and 3a, or 3b)	No	No

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Appendix E. Biological Resources of Concern

E.1 Introduction

Early in the planning process, the planning team cooperatively identified species, species groups, and communities of concern for Deer Flat National Wildlife Refuge (NWR or Refuge). A comprehensive list of these resources was compiled based upon review of numerous plans (see Section 1.8 of the Final Comprehensive Conservation Plan/Environmental Impact Statement [CCP/EIS]), many of which highlight priority species or habitats for conservation. The comprehensive list of potential resources of concern is contained in Table E-3. In addition, a table of species and species groups specifically identified in establishing documents for the Refuge was compiled (Table E-1). A complete list of current species known to occur on the Refuge is located in Table E-5.

The table identifying our comprehensive resources of concern was further culled in developing a more targeted assemblage of priority resources of concern. Most of the biological emphasis of the CCP is focused on maintaining and restoring these priority resources. Table E-4 contains the priority resources of concern identified for the Refuge. Definitions for the column headings in Table E-4 are as follows:

- **Focal Species:** Species selected as representatives or indicators for the overall condition of the conservation target. In situations where the conservation target may include a broad variety of habitat structures and plant associations, several different conservation focal species may be listed. In addition, species with specific "niche" ecological requirements may be listed as a focal species. Management will be focused on attaining conditions required by the focal species. Other species using the conservation target will generally be expected to benefit as a result of management for the focal species.
- **Habitat Type:** The general habitat description utilized by the focal species.
- **Habitat Structure:** The specific and measurable habitat attributes considered necessary to support the focal species.
- **Life History Requirement:** The general season of use for the focal species.
- **Other Benefiting Species:** Other species that are expected to benefit from management for the selected focal species. The list is not comprehensive; see Table E-3 for the Refuge for a more complete list.

Table E-1. Summary of Species and Habitats Identified in Refuge Purposes

Conservation Target (species/species group or habitat)	Supporting Habitat Type	Life History Requirement	Supporting Documentation
Migratory birds	Open water, mudflats, and emergent plant beds for the reservoir	Breeding	Executive Order (E.O.) BIDEH 1032 (February 25, 1909)
Migratory birds and other wildlife	Open water, mudflats, and emergent plant beds for the reservoir	Breeding and wintering	E.O. 7655 "Establishing Deer Flat Migratory Waterfowl Refuge, Idaho" (Franklin D. Roosevelt; July 12, 1937)
Migratory birds and other wildlife	Island habitats: riparian and shrub steppe	Breeding and wintering	E.O. 7691 "Establishing the Snake River Migratory Waterfowl Refuge, Idaho" (Franklin D. Roosevelt; August 17, 1937)
Waterfowl (ducks and geese): migratory feeding/resting areas Geese: wintering	Migration and wintering habitat	Feeding, resting, and wintering	Migratory Bird Conservation Commission Memorandum No. 9 (February 20, 1951)
Mallard and western Canada geese: wintering (500,000-800,000 ducks and geese annually; terminus of flight from prairie provinces of Canada)	Marshland for nesting and for foraging, specifically smartweed and dwarfish "tealgrass"	Food for waterfowl	Migratory Bird Conservation Commission Memorandum No. 8 (February 15, 1955)

E.2 Biological Integrity, Diversity, and Environmental Health

Natural Plant and Waterfowl Populations with Natural Processes and Limiting Factors

Table E-2 provides an overview of habitats with the plant communities and animals typically associated with that habitat type. Not all of the species presented in this table have been documented on Deer Flat NWR.

Table E-2. Summary of Biological Integrity, Diversity, and Environmental Health (BIDEH)

Habitats (plant communities that represent existing BIDEH)	Population/Habitat Attributes (age class, structure, serial stage, species composition)	Natural Processes Responsible for These Conditions	Limiting Factors
Alkaline wetlands	Seasonal; semipermanent; flat basin characterized by high annual/seasonal variability in water and salinity levels; mosaic, ephemeral layers of wet grasslands, shrubs, perennial forbs; fine sandy loam/silt loam alkaline soils. Layers of vegetation include • Reed, sedge, rush spp., Sandberg's bluegrass, Nevada bluegrass, redtop, common spikerush, inland saltgrass, foxtail barley, Nuttall's alkaligrass, alkali sacaton, duckweed, rough bugleweed, willowherb, alkali mallow, milkweed spp., sumpweed, and common cattail; and • Sand dropseed, beardless wildrye, mugwort, western wheatgrass, greasewood spp., yarrow, gray/green rabbitbrush, and golden currant. *Potential conservation species: migrating, wintering, breeding waterfowl species, American avocet, Wilson's phalarope, dunlin, sandpiper, green-backed heron, long-billed curlew, killdeer, black-necked stilt, snowy egret, peregrine falcon, northern harrier, sandhill crane, mallard, and Great Basin spadefoot toad.*	Seasonal and annual levels of precipitation and water levels; low/flat land areas developed with intermittent natural springs. Seasonal drying with poorly drained soils. Broad natural channel basin area possibly formed from glacial flood drainage.	Currently nonexistent; Lake Lowell reservoir created in 1906 by damming three low areas in a natural broad channel of Deer Flat region. Altered hydrology.
Shrub-steppe	Semiarid; characterized by three layers of vegetation: • Dominant sagebrush (*Artemisia* spp.) <2 m including bitterbrush, fourwing saltbush, gray/green rabbitbrush, greasewood, spiny horsebrush, and spiny hopsage; • Understory of native bunch grasses	Periodic fire; shallow well-drained soils.	Loss of perennial grasses; invasive species encroachment including cheatgrass, Canada thistle, broadleaved pepperweed, hoary cress, rush skeletonweed, jointed goatgrass, Scotch thistle,

Habitats (plant communities that represent existing BIDEH)	Population/Habitat Attributes (age class, structure, serial stage, species composition)	Natural Processes Responsible for These Conditions	Limiting Factors
	and forbs including bluebunch wheatgrass, Indian ricegrass, squirreltail bottlebrush, steppe bluebunch, Idaho fescue, Great Basin wildrye, Sandberg's bluegrass, perennial bunchgrasses, perennial and annual herbs, perennial forbs; and • Microbiotic crust composed of algae, lichens, and mosses. *Potential conservation species: peregrine falcon, ferruginous hawk, Swainson's hawk, American kestrel, horned lark, grasshopper sparrow, meadowlark, loggerhead shrike, burrowing owl, northern pygmy-owl, pygmy rabbit, western longnose snake, black-throated sparrow, sage sparrow, sage thrasher, black-collared lizard, and southern Idaho ground squirrel.*		and nonnative grasses. Altered fire regime/return interval; past grazing/soil disturbance; loss of native habitat; fragmentation. Widespread presence of cheatgrass may cause unnatural and severe fires to sagebrush-steppe habitat.
Emergent wetlands • Riverine • Palustrine • Persistent • Nonpersistent	Seasonal; semipermanent; developing and varying according to seasonal natural spring inflow, river flow, and soil texture/ permeability. Diversity of hydric vegetation includes sedge, rush, reed spp., flatsedge, mannagrass, rough bentgrass, bulrush, stinging nettle, common cattail, water plantain, milkweed spp., smartweed, yellowcress, goldenrod, smooth sumac, wood's rose, and peachleaf willow. *Potential conservation species: migrating, wintering, breeding waterfowl species, cinnamon teal, northern pintail, lesser scaup, Canada geese, white pelican, western grebe, tundra swan, shorebird species, red-necked phalarope, American bittern, long-billed curlew, violet-green swallow, marsh wren, snowy egret, and northern leopard frog.*	Periodic flooding; seasonal fluctuations/drying but more permanent water situation than typical seasonal wetlands; natural springs.	Invasive species including Russian olive, salt cedar, purple loosestrife, poison hemlock, Bohemian knotweed, Japanese knotweed, houndstongue, and white bryony. Flood depth and duration; habitat loss; altered water regimes. Water quality issues include pollution, temperature, and contaminants. Disturbance from public uses. Trophic bioaccumulation of chemical contaminants and heavy metals.
Riverine islands • Shrub-scrub	Seasonal; semipermanent; permanent, developing, and varying according to seasonal river flow. Native canopy and shrub layer dominates include poplar, willow, sagebrush, rabbitbrush, hawthorn, wheatgrass, reedgrass, reed, and sedge defined by >30% canopy	Periodic, seasonal flood events; riparian habitat connectivity; submergent vegetation, upland scrub. Spring flows create scours and cut new channels that	Encroachments of invasive plant species include salt cedar, Russian olive, poison hemlock, cheatgrass, and nonnative grasses.

Habitats (plant communities that represent existing BIDEH)	Population/Habitat Attributes (age class, structure, serial stage, species composition)	Natural Processes Responsible for These Conditions	Limiting Factors
	cover of shrubs or small trees <6 m (20 feet) in height. *Potential conservation species: bald eagle, osprey, white-throated swift, Barrow's goldeneye, bufflehead, white-winged scoter, western grebe, red-breasted merganser, canyon wren, sage thrasher, snowy egret, double-crested cormorant, beaver, river otter, Canada goose, bank swallow, mourning dove, black-crowned night-heron, yellow-breasted chat, green-tailed towhee, white pelican, black rosy-finch, gray rosy-finch, trumpeter swan, and shining flatsedge.*	isolate islands.	Pollution; species predation. Nonfunctioning floodplain; dams reduce/alter flood events on Snake River; altered water/channel regimes. Past grazing and invasive species produce competition and soil binding; lack of silt deposition; loss of habitat.
Riverine channel • Lower perennial	Open, generally flowing water; potentially supporting rearing anadromous fish; supports resident fish, affording fish passage throughout watershed. *Potential conservation species: Canada goose, tundra swans, American coot, osprey, bald eagle, double-crested cormorant, pied-billed grebe, western grebe, caspian tern, resident fish, white sturgeon, and Idaho springsnail.*	Periodic flooding with flood energy variable depending on location of stream/river in landscape, perennial water flows, open water, submergent vegetation.	Agriculture ad open pasture; excess nutrients and pollutants. Contaminants, siltation, water quality, and increased temperature. Altered hydrology; lack of adequate flows to maintain dynamic river channel morphology. Encroachment of invasive species includes salt cedar and Russian olive. Encroachment of residential and commercial development.
Large flocks of migrating/ wintering waterfowl	Snake River Islands; Great Basin wetlands. *Potential conservation species: most waterfowl species identified in Purpose documents and table of potential resources of concern.*	Historical, predominant, Pacific population of western Canada geese and waterfowl species. Riparian habitats of river islands, emergent wetlands, alkaline marsh, and natural springs provide migratory connectivity; regions of critical breeding and wintering areas.	Seasonal drawdown of lake for agriculture irrigation reduces wetland area. Damming; manipulated river hydrology. Lack of periodic fire. Residential and commercial development within floodplain. Water quality issues; pollution, contaminants; increased temperature.

Habitats (plant communities that represent existing BIDEH)	Population/Habitat Attributes (age class, structure, serial stage, species composition)	Natural Processes Responsible for These Conditions	Limiting Factors
		Periodic flooding of river plain and lowland areas naturally provides islands of refuge and forage.	Human disturbance from recreational activities.

Table E-3. Deer Flat National Wildlife Refuge Potential Resources of Concern

Species/Species Groups/Communities	Refuge Purposes[a]	Biological Diversity, Integrity and Environmental Health	Federal T and E Species[b]	Pacific Flyway Waterfowl Plan[c]	N. American Waterfowl Management Plan (2004)[d]	Partners in Flight Priority WF Spp BCRs 9 and 10[e]	ID PIF BCRs 9 and 10[f]	IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]	IM West Reg. Shorebird Plan and BCR 9and10[h]	N. American Waterbird Conservation Plan[i]	Idaho CWCS Species of Greatest Conservation Need[j]	BLM Sensitive Species Type[k]	Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]	BCC National (Table 48)[m]	USFWS Gamebirds Below Desired Condition(GBBDC)	Columbia Plateau Ecoregional Assessment[n]	Landbird Conservation Strategy 2000[o]
BIRDS *known to nest on Refuge																	
Migrating waterfowl	X	X		X	X												
Nesting waterfowl	X	X		X	X												
American avocet * (*Recurvirostra americana*)	X	X					23 H	5			G5, S5B, S3		X				
American bittern * (*Botaurus lentiginosus*)	X	X					19 M		M-10								
American coot * (*Fulica americana*)	X	X															
American golden plover (*Pluvialus dominica*)	X																
American kestrel * (*Falco sparverius*)	X	X															
American robin * (*Turdus migratorius*)		X															
American tree sparrow (*Spizella arborea*)		X															PR
American white pelican (*Pelecanus erythrorhynchos*)	X	X					24 H		H	X	G3, S1B	2				X	
American wigeon* (*Anas americana*)	X	X			X										X		
Ash-throated flycatcher (*Myiarchus tuberculifer*)							18 M										
Baird's sandpiper (*Calidris bairdii*)	X	X						1									
Bald eagle * (*Haleaeetus leucocephalus*)	X	X					19 M				G4, S3B, S4N, E	1				X	PR
Bank swallow * (*Riparia riparia*)		X															
Barrow's goldeneye (*Bucephala islandica*)	X	X			X	X	24 H					5					

Species/Species Groups/Communities	**Refuge Purposes[a]**	**Biological Diversity, Integrity and Environmental Health**	**Federal T and E Species[b]**	**Pacific Flyway Waterfowl Plan[c]**	**N. American Waterfowl Management Plan (2004)[d]**	**Partners in Flight Priority WF Spp BCRs 9 and 10[e]**	**ID PIF BCRs 9 and 10[f]**	**IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]**	**IM West Reg. Shorebird Plan and BCR 9and10[h]**	**N. American Waterbird Conservation Plan[i]**	**Idaho CWCS Species of Greatest Conservation Need[j]**	**BLM Sensitive Species Type[k]**	**Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]**	**BCC National (Table 48)[m]**	**USFWS Gamebirds Below Desired Condition(GBBDC)**	**Columbia Plateau Ecoregional Assessment[n]**	**Landbird Conservation Strategy 2000[o]**
Belted kingfisher * (*Ceryle alcyon*)		X															
Black rosy-finch (*Leucosticte atrata*)		X					23 H				G4, S3						PR
Black tern (*Chlidonias niger*)	X	X					18 M		H	X	G4, S1B, S1	3				X	
Black-bellied plover (*Pluvialis squatarola*)	X							2									
Black-billed magpie * (*Pica hudsonia*)							19 H										
Black-capped chickadee * (*Poecile atricapillus*)							13 M										
Black-chinned hummingbird * (*Archilochus alexandri*)		X					23 H										
Black-crowned night heron * (*Nycticorax nycticorax*)	X	X							M-9	X	G5, S2B						
Black-necked stilt * (*Himantopus mexicanus*)	X	X					18 H	5			G5, S3B, S3						
Black-throated gray warbler (*Dendroica nigrescens*)							22 H										PR
Black-throated sparrow (*Amphispiza bilineata*)		X					21 M				S2B	4				X	MA
Blue-winged teal * (*Anas discors*)	X	X			X												
Bohemian waxwing (*Bombycilla garrulus*)																	PR
Bonaparte's gull (*Larus philadelphia*)	X									X							
Brewer's blackbird * (*Euphagus cyanocephalus*)							15 M					5					
Brewer's sparrow (*Spizella breweri*)							24 H				G5, S3B	3	X	X			MA
Broad-tailed hummingbird * (*Selasphorus platycercus*)		X															
Brown creeper (*Certhia americana*)							18 H										
Bufflehead (*Bucephala albeola*)	X	X			X		18 M										
Bullock's oriole * (*Icterus bullockii*)							19 M										
Burrowing owl (*Athene cunicularia*)		X	SOC				19 M				G4, S2B, S2	5	X	X			

Species/Species Groups/Communities	Refuge Purposes[a]	Biological Diversity, Integrity and Environmental Health	Federal T and E Species[b]	Pacific Flyway Waterfowl Plan[c]	N. American Waterfowl Management Plan (2004)[d]	Partners in Flight Priority WF Spp BCRs 9 and 10[e]	ID PIF BCRs 9 and 10[f]	IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]	IM West Reg. Shorebird Plan and BCR 9and10[h]	N. American Waterbird Conservation Plan[i]	Idaho CWCS Species of Greatest Conservation Need[j]	BLM Sensitive Species Type[k]	Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]	BCC National (Table 48)[m]	USFWS Gamebirds Below Desired Condition(GBBDC)	Columbia Plateau Ecoregional Assessment[n]	Landbird Conservation Strategy 2000[o]
Bushtit * (*Psaltriparus minimus*)							18 M										
California gull * (*Larus californicus*)	X						19 M		M-10	X	G5, S2B, S3N						
Calliope hummingbird (*Stellula calliope*)							23 H					3					PR
Canada goose * (*Branta canadensis*)	X	X		X	X												
Canvasback (*Aythya valisineria*)	X				X		20 M				S2N				X		
Canyon wren * (*Catherpes mexicanus*)		X					18 M										
Caspian tern * (*Sterna caspia*)	X	X					17 M		M-10	X	G5, S2B						
Cassin's finch (*Carpodacus cassinii*)							19 M					5					MA
Cassin's vireo (*Vireo cassinii*)							X										
Cattle egret (*Bubulcus ibis*)	X									X	G5, S2B						
Chipping sparrow (*Spizella passerina*)							16 M										
Cinnamon teal * (*Anas cyanoptera*)	X	X			X	X	21 H										
Clark's grebe (*Aechmophorus clarkii*)	X						20 M		M-10	X	G5, S2B						
Clark's nutcracker (*Nucifraga columbiana*)																	
Common goldeneye (*Bucephala clangula*)	X	X			X												
Common grackle (*Quiscalus quiscula*)	X	X															
Common loon (*Gavia immer*)	X						X		H		G5, S1B, S2N						
Common merganser * (*Mergus merganser*)	X	X			X												
Common poorwill (*Phalaenoptilus nuttallii*)							21 M										
Common redpoll (*Carduelis flammea*)	X																
Common snipe * (*Gallinago gallinago*)	X							3									
Common tern (*Sterna hirundo*)	X								M-10	X				X			
Cooper's hawk (*Accipiter cooperii*)	X																

Species/Species Groups/Communities	Refuge Purposes[a]	Biological Diversity, Integrity and Environmental Health	Federal T and E Species[b]	Pacific Flyway Waterfowl Plan[c]	N. American Waterfowl Management Plan (2004)[d]	Partners in Flight Priority WF Spp BCRs 9 and 10[e]	ID PIF BCRs 9 and 10[f]	IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]	IM West Reg. Shorebird Plan and BCR 9and10[h]	N. American Waterbird Conservation Plan[i]	Idaho CWCS Species of Greatest Conservation Need[j]	BLM Sensitive Species Type[k]	Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]	BCC National (Table 48)[m]	USFWS Gamebirds Below Desired Condition(GBBDC)	Columbia Plateau Ecoregional Assessment[n]	Landbird Conservation Strategy 2000[o]
Dark-eyed junco (*Junco hyemalis*)							13 M										
Double-crested cormorant * (*Phalacrocorax auritus*)	X	X								X							
Dunlin (*Calidris alpina*)	X	X						2									
Eared grebe * (*Podiceps nigricollis*)	X						15 M		H-9	X							
Ferruginous hawk (*Buteo regalis*)	X	X					23 H				G4, S3B	3	X	X		X	
Forster's tern (*Sterna forsteri*)	X						20 M		H-10/ M-9	X	G5, S1B, S1					X	
Fox sparrow (*Passerellailiaco*)																	
Franklin's gull (*Larus pipixcan*)	X						24 H		H	X	G4G5 , S2B					X	
Gadwall* (*Anas strepera*)	X				X	X	17 M										
Glaucous gull (*Larus hyperboreus*)	X									X							
Golden eagle (*Aquila chrysaetos*)	X						19 H						X				
Golden-crowned kinglet (*Regulus satrapa*)	X																
Grasshopper sparrow (*Ammodramus savannarum*)		X					20 H				G5, S2B	5		X		X	MA
Gray flycatcher (*Empidonax wrightii*)	X						24 H										
Great blue heron * (*Ardea herodias*)	X									X							
Great egret (*Ardea alba*)	X									X	G5, S1B						
Greater white-fronted goose (*Anser albifrons*)	X	X			X										X		
Greater yellowlegs (*Tringa melanoleuca*)	X							3									
Green heron * (*Butorides virescens*)	X	X								X							
Green-tailed towhee (*Pipilo chlorurus*)		X					19 M					5				X	PR
Green-winged teal * (*Anas crecca*)	X	X			X												
Gyrfalcon (*Falco rusticolus*)	X																PR
Harlequin duck (*Histrionicus histrionicus*)	X				X	X	20 M				G4, S1B	4			X		

Species/Species Groups/Communities	Refuge Purposes[a]	Biological Diversity, Integrity and Environmental Health	Federal T and E Species[b]	Pacific Flyway Waterfowl Plan[c]	N. American Waterfowl Management Plan (2004)[d]	Partners in Flight Priority WF Spp BCRs 9 and 10[e]	ID PIF BCRs 9 and 10[f]	IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]	IM West Reg. Shorebird Plan and BCR 9and10[h]	N. American Waterbird Conservation Plan[i]	Idaho CWCS Species of Greatest Conservation Need[j]	BLM Sensitive Species Type[k]	Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]	BCC National (Table 48)[m]	USFWS Gamebirds Below Desired Condition(GBBDC)	Columbia Plateau Ecoregional Assessment[n]	Landbird Conservation Strategy 2000[o]
Harris' sparrow (*Zonotrichia querula*)														X			
Herring gull (*Larus argentatus*)	X									X							
Hooded merganser * (*Lophodytes cucullatus*)	X	X			X		22 H				G5, S2B, S3N						
Horned grebe (*Podiceps grisegena*)	X										S1						
Horned lark * (*Eremophila alpestris*)		X															
Indigo bunting (*Passerina cyanea*)																	PR
Killdeer * (*Charadrius vociferus*)	X	X					19 H	3									
Lapland longspur (*Calcarius lapponicus*)																	PR
Lark sparrow * (*Chondestes grammacus*)							20 H										
Lazuli bunting (*Passerina amoena*)		X					19 M										
Least bittern (*Ixobrychus exilis*)	X								M-9								
Least sandpiper (*Calidris minutilla*)	X	X						4									
Lesser scaup (*Aythya affinis*)	X	X			D		17 M				G5, S3				X		
Lesser yellowlegs (*Tringa flavipes*)	X							2									
Lewis's woodpecker * (*Melanerpes lewis*)		X					23 H				G4, S3B	3	X	X		X	MA
Lincoln's sparrow (*Melospiza lincolnii*)																	PR
Loggerhead shrike * (*Lanius ludovianus*)		X	SOC				20 H					3	X	X		X	
Long-billed curlew (*Numenius americanus*)	X	X	SOC				23 H	5			G5, S2B	5	X	X		X	
Long-billed dowitcher (*Limnodromus scolopaceus*)	X							5									
MacGillivray's warbler (*Oporornis tolmiei*)							21 H										
Mallard * (*Anas platyrhychos*)	X	X			X												
Marbled godwit (*Limosa fedoa*)	X							4			S2		X	X			
Marsh wren * (*Cistothorus palustris*)		X					20 M										

Species/Species Groups/Communities	Refuge Purposes[a]	Biological Diversity, Integrity and Environmental Health	Federal T and E Species[b]	Pacific Flyway Waterfowl Plan[c]	N. American Waterfowl Management Plan (2004)[d]	Partners in Flight Priority WF Spp BCRs 9 and 10[e]	ID PIF BCRs 9 and 10[f]	IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]	IM West Reg. Shorebird Plan and BCR 9and10[h]	N. American Waterbird Conservation Plan[i]	Idaho CWCS Species of Greatest Conservation Need[j]	BLM Sensitive Species Type[k]	Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]	BCC National (Table 48)[m]	USFWS Gamebirds Below Desired Condition(GBBDC)	Columbia Plateau Ecoregional Assessment[n]	Landbird Conservation Strategy 2000[o]
Mountain bluebird (*Sialia currucoides*)							X										PR
Mountain chickadee (*Poecile gambeli*)							16 M										
Mourning dove * (*Zenaida macroura*)		X		X											X		
Nashville warbler (*Vermivora ruficapilla*)							20 M										
Northern flicker * (*Colaptes auratus*)		X					15 M										
Northern goshawk (*Accipiter gentilis*)	X		SOC				21 H					3				X	
Northern harrier * (*Circus cyaneus*)	X	X					18 M							X			
Northern pintail* (*Anas acuta*)	X	X			X D						G5, S5B, S2N				X		
Northern pygmy-owl (*Glaucidium gnoma*)		X					X					5					
Northern rough-winged swallow * (*Stelgidopteryx serripennis*)							19 M										
Northern shoveler * (*Anas clypeata*)	X	X			X						S2N						
Long-tailed duck – Oldsquaw (*Clangula hyemalis*)	X	X			X												
Olive-sided flycatcher (*Contopus cooperi*)							21 H					3		X			MA
Orange-crowned warbler (*Vermivora celata*)																	
Osprey * (*Pandion haliaetus*)	X	X					17 M										
Pectoral sandpiper (*Calidris melanotos*)	X							1									
Peregrine falcon (*Falco peregrinus*)	X	X					19 M				G4T3, S2B, E	3	X	X		X	PR
Pied-billed grebe * (*Podilymbus podiceps*)	X	X															
Pine siskin (*Carduelis pinus*)							14 M										
Plumbeous vireo (*Vireo plumbeus*)							22 H										
Prairie falcon (*Falco mexicanus*)	X	X					24 H					3	X	X			
Red knot (*Calidris canutus*)	X							1						X			
Red-breasted merganser (*Mergus serrator*)	X	X			X												

Species/Species Groups/Communities	**Refuge Purposes[a]**	**Biological Diversity, Integrity and Environmental Health**	**Federal T and E Species[b]**	**Pacific Flyway Waterfowl Plan[c]**	**N. American Waterfowl Management Plan (2004)[d]**	**Partners in Flight Priority WF Spp BCRs 9 and 10[e]**	**ID PIF BCRs 9 and 10[f]**	**IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]**	**IM West Reg. Shorebird Plan and BCR 9and10[h]**	**N. American Waterbird Conservation Plan[i]**	**Idaho CWCS Species of Greatest Conservation Need[j]**	**BLM Sensitive Species Type[k]**	**Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]**	**BCC National (Table 48)[m]**	**USFWS Gamebirds Below Desired Condition(GBBDC)**	**Columbia Plateau Ecoregional Assessment[n]**	**Landbird Conservation Strategy 2000[o]**
Red-breasted nuthatch (*Sitta canadensis*)							14 M										
Redhead * (*Aythya americana*)	X	X			X	X	22 H										
Red-necked phalarope (*Phalaropus lobatus*)	X	X						4									
Red-tailed hawk * (*Buteo jamaicensis*)	X	X															
Ring-billed gull * (*Larus delawarensis*)	X						15 M			X							
Ring-necked duck (*Aythya collaris*)	X				X		20 M								X		
Rock wren * (*Salpinctes obsoletus*)							19 H										
Ross's goose (*Chen rossii*)	X	X			X												
Rough-legged hawk (*Buteo lagopus*)	X	X															PR
Ruddy duck* (*Oxyura jamaicensis*)	X				X	X	19 M				S2N						
Rufous hummingbird (*Selasphorus rufus*)							22 H							X			MA
Sabine's gull (*Xema sabini*)	X									X							
Sage sparrow (*Amphispiza belli*)		X					25 H					3	X			X	PR
Sage thrasher * (*Oreoscoptes montanus*)		X					22 H					5				X	PR
Sanderling (*Calidris alba*)	X							1					X				
Sandhill crane (*Grus canadensis*)	X	X		X			24 H				G5, S3B						
Savannah sparrow * (*Passerculus sandwichensis*)		X															
Semi-palmated plover (*Charadrius semipalmatus*)	X							3									
Semi-palmated sandpiper (*Calidris pusilla*)	X	X						1									
Sharp-shinned hawk (*Accipiter striatus*)	X	X					18 H										
Short-eared owl * (*Asio flammeus*)							23 H				G5, S4	5		X			MA
Snow bunting (*Plectrophenax nivalis*)																	PR
Snow goose (*Chen caerulescens*)	X	X			X										X		
Snowy egret (*Egretta thula*)	X	X					14 M		H-9/ M-10	X	G5, S2B					X	

Species/Species Groups/Communities	**Refuge Purposes[a]**	**Biological Diversity, Integrity and Environmental Health**	**Federal T and E Species[b]**	**Pacific Flyway Waterfowl Plan[c]**	**N. American Waterfowl Management Plan (2004)[d]**	**Partners in Flight Priority WF Spp BCRs 9 and 10[e]**	**ID PIF BCRs 9 and 10[f]**	**IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]**	**IM West Reg. Shorebird Plan and BCR 9and10[h]**	**N. American Waterbird Conservation Plan[i]**	**Idaho CWCS Species of Greatest Conservation Need[j]**	**BLM Sensitive Species Type[k]**	**Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]**	**BCC National (Table 48)[m]**	**USFWS Gamebirds Below Desired Condition(GBBDC)**	**Columbia Plateau Ecoregional Assessment[n]**	**Landbird Conservation Strategy 2000[o]**
Snowy owl (*Nyctea scandiaca*)																	PR
Solitary sandpiper (*Tringa solitaria*)	X							2					X	X			
Song sparrow * (*Melospiza melodia*)		X															
Sora * (*Porzana carolina*)	X																
Spotted sandpiper * (*Actitus macularius*)	X	X						3									
Spotted towhee * (*Pipilo maculatus*)							17 M										
Stilt sandpiper (*Calidris himantopus*)	X	X						1						X			
Swainson's hawk * (*Buteo swainsoni*)	X	X					23 H				G5, S3B	5	X	X			MA
Swainson's thrush (*Catharus ustulatus*)																	
Townsend's solitaire (*Myadestes townsendi*)							19 M										
Townsend's warbler (*Dendroica townsendi*)							22 H										
Trumpeter swan (*Cygnus buccinator*)	X	X	SOC	X	X	X	26 H				G4, S1B, S2N	3			X	X	
Tundra swan (*Cygnus columbianus*)	X	X		X	X												
Varied thrush (*Ixoreus naevius*)							22 H										PR
Vaux's swift (*Chaetura vauxi*)	X						23 H					5					
Vesper sparrow * (*Pooecetes gramineus*)							16 M										
Violet-green swallow * (*Tachycineta thalassina*)		X					17 M										
Virginia rail * (*Rallus limicola*)	X																
Warbling vireo (*Vireo gilvus*)							18 M										
Western grebe * (*Aechmophorus occidentalis*)	X	X					22 H		H-9/ M-10	X	G5, S2B						
Western kingbird * (*Tyrannus jerticalis*)																	
Western meadowlark * (*Sturnella neglecta*)		X					18 H										
Western sandpiper (*Calidris mauri*)	X	X						4									
Western screech owl * (*Otus kennicottii*)		X															

Species/Species Groups/Communities	Refuge Purposes[a]	Biological Diversity, Integrity and Environmental Health	Federal T and E Species[b]	Pacific Flyway Waterfowl Plan[c]	N. American Waterfowl Management Plan (2004)[d]	Partners in Flight Priority WF Spp BCRs 9 and 10[e]	ID PIF BCRs 9 and 10[f]	IM West Reg. Shorebird Plan and U.S. Shorebird Cons. Plan[g]	IM West Reg. Shorebird Plan and BCR 9and10[h]	N. American Waterbird Conservation Plan[i]	Idaho CWCS Species of Greatest Conservation Need[j]	BLM Sensitive Species Type[k]	Birds of Cons. Concern 2002 (USFWS) BCR 9 and 10[l]	BCC National (Table 48)[m]	USFWS Gamebirds Below Desired Condition(GBBDC)	Columbia Plateau Ecoregional Assessment[n]	Landbird Conservation Strategy 2000[o]
Western tanager * (*Piranga cudoviciana*)							20 H										
Western wood-pewee (*Contopus sordidulus*)							17 M										
White-faced ibis (*Plegadis chihi*)	X	X	SOC				20 H		M	X	G5, S2B	4					
White-throated sparrow (*Zonotrichia albicollis*)																	PR
White-throated swift * (*Aeronautes saxatalis*)	X	X					18 M										MA
White-winged scoter (*Melanitta fusca*)	X	X			XD												
Willet (*Catoptrophorus semipalmatus*)	X						20 M	4									
Willow flycatcher (*Empidonax trailii*)							21 H					3					MA
Wilson's phalarope (*Phalaropus tricolor*)	X	X					21 M	5			G5, S3B	5	X	X			
Winter wren (*Troglodytes troglodytes*)																	
Wood duck * (*Aix sponsa*)	X				X		19 M								X		
Yellow warbler * (*Dendroica petechia*)							18 H										
Yellow-billed cuckoo* (*Coccyzus americanus*)		X	SOC				19 M				G5, S2B	1	C	LT /L E			
Yellow-breasted chat * (*Icteria virens*)		X															
Yellow-headed blackbird * (*Xanthocephalus xanthocephalus*)		X					18 M										PR
Yellow-rumped warbler (*Dendroica coronata*)							16 M										
MAMMALS																	
Pygmy rabbit (*Brachylagus idahoensis*)		X														X	
Southern Idaho ground squirrel (*Spermophilus brunneus endemicus*)		X	SOC														
AMPHIBIANS																	
Northern leopard frog (*Rana pipiens*)		X	SOC								G5, S2	2					
Western toad (*Bufo boreas*)		X	SOC														
REPTILES																	
Western longnose snake (*Rhinicheilus lecontei*)		X									G5, S2	3					

Table E-3 (continued). Category Codes: Deer Flat National Wildlife Refuge Potential Resources of Concern

Category Codes:	* known to nest on Refuge either Lake Lowell or Snake River Islands
Refuge Purposes:	X - species groups benefiting from waterfowl/Refuge management (1967 Refuge Prospectus)
Biological Diversity, Integrity, and Environmental Health:	X - Refuge-compatible species
Federal T and E:	LE - Endangered
	LT -Threatened
	SOC - Species of Concern
Pacific Flyway Waterfowl Plan:	X - species benefiting from waterfowl plan
North American Waterfowl Management Plan:	D - decreasing long-term trend
Idaho Partners in Flight:	Idaho Bird Conservation (Version 1.0 January 2000)
	H - High priority breeding
	M - Moderate priority in habitat management and monitoring plans/high responsibility
	Bold face - Primary breeding habitat available on Refuge
Intermountain West Regional Shorebird Plan:	5 - Critically important
	4 - Very important
	3 - Important
	2 - Slightly important
	1 - Unimportant
Idaho CWCS:	Species of Greatest Conservation Need
	S1- Critically imperiled in Idaho
	S2 - Imperiled in Idaho
	S3 - Vulnerable in Idaho
	S4 - Apparently secure in Idaho; some cause for long-term concern due to declines or other factors
	S5 - Secure in Idaho; common, widespread, abundant
	G4 - Apparently secure globally; some cause for long-term concern due to declines or other factors
	G5 - Secure globally; common, widespread, abundant
	N - Nonbreeding
	B - Breeding, conservation status refers to breeding populations of this species
	E - State Endangered
	SNR - Unranked: conservation status not yet assessed
BLM Sensitive Species List:	Type 1 - Threatened, endangered, proposed and candidate
	Type 2 - Rangewide/Globally imperiled
	Type 3 - Regional/State imperiled
	Type 4 - Peripheral
	Type 5 - Watch list
Birds of Conservation Concern: Region 1 USFWS	
BCR 9 and 10	X - Regional Birds of Conservation Concern
BCC/National:	X - National Birds of Conservation Concern
GBBDC:	X - Gamebirds below desired condition
The Nature Conservancy (TNC) Columbia Plateau Ecoregional Assessment:	X - Species/Habitats of concern
Landbird Conservation Plan:	IM - Immediate Action
	MA - Management
	PR - Long-term Planning and Responsibility
Other Plans:	Addressed in Plan, no specific category

Sources/Criteria for Potential Resources of Concern Table

[a] Deer Flat National Wildlife Refuge Purpose: E.O. 7655, July 12, 1937; 16 U.S.C. 715d (Migratory Bird Conservation Act); 16 U.S.C. 460k-1 (Refuge Recreation Act).

[b] USFWS Endangered Species Program.

[c] SPPCG (Subcommittee on Pacific Population of Canada Geese). 2000. Pacific Flyway management plan for the Pacific Population of Canada Geese (unpublished report). Pacific Flyway Study Committee, U.S. Fish and Wildlife Service. Portland, OR. 31 pp.

[d] NAWMPC (North American Waterfowl Management Plan Committee). 2004. North American waterfowl management plan. Implementation framework: strengthening the biological foundation. Canadian Wildlife Service, U.S. Fish and Wildlife Service, Secretaria de Medio Ambiente y Recursos Naturales. 106 pp.

[e] IWJV (Intermountain West Joint Venture) Idaho Steering Committee. 2005. Coordinated implementation plan for bird conservation in Idaho. Appendix A, pp. 34-42. Available at: http://saltshake.com.s50844.gridserver.com/?get=1.28.148. Accessed May 18, 2012.

[f] Idaho Partners in Flight 2000. Idaho Bird Conservation Plan, Version 1.0: Appendices 2 and 3 pp. 118-123. 166 pp.

[g] Brown, S., C. Hickey, B. Harington, and R. Gill, eds. 2001. United States shorebird conservation plan, 2nd ed. Manomet Center for Conservation Sciences. Manomet, MA. 64 pp.

[h] Oring, L.W., L. Neel, and K.E. Oring. 2000. U.S. shorebird conservation plan. Intermountain West regional shorebird plan version 1.0. Available at: shorebirdplan.fws.gov/RegionalShorebird/downloads/IMWEST4.doc. Accessed May 18, 2012.

[i] Kushlan, J.A., M. Steinkamp, K. Parsons, J. Capp, M.A. Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R.M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J.E. Saliva, B. Syderman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird conservation for the Americas: the North American waterbird conservation plan, version 1. Waterbird Conservation for the Americas. Washington, D.C. 84 pp.

[j] IDFG (Idaho Department of Fish and Game). 2005. Idaho comprehensive wildlife conservation strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. Available at: http://fishandgame.idaho.gov/public/wildlife/cwcs/. Accessed May 18, 2012.

[k] BLM (Bureau of Land Management). 2011. BLM sensitive species. Available at: http://www.blm.gov/wy/st/en/programs/pcp/species/sensitive.html. Accessed May 25, 2012.

[l] USFWS (U.S. Fish and Wildlife Service). 2002c. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. Available at: http://www.fws.gov/midwest/wind/references/BCC2002.pdf. Accessed June 11, 2012.

[m] USFWS Division of Migratory Bird Management. 2007. Gamebirds below desired condition (draft). Available at: http://library.fws.gov/bird_publications/gamebirds_conditions.pdf. Accessed June 11, 2012.

[n] Andelman S., K. Gillem, C. Groves, C. Hansen, J. Humke, T. Klahr, L. Kramme, B. Moseley, M. Reid, D. Vander Schaaf, M. Coad, C. Deforest, C. Macdonald, J. Baumgartner, J. Hak, C. Hansen, S. Hobbs, L. Lunte, L. Smith, and C. Soper. 1999. The Columbia Plateau ecoregional assessment: a pilot effort in ecoregional conservation. The Nature Conservancy. Available at: http://waconservation.org/projects/ecoregions/. Accessed May 25, 2012.

[o] Altman, B. and A. Holmes. 2000. Conservation strategy for landbirds in the Columbia Plateau of Eastern Oregon and Washington. Version 1.0. Oregon-Washington Partners in Flight. 97 pp.

Table E-4 includes focal species and habitat types and structures commonly associated with these species. Not all species listed in this table have been documented on the Refuge.

Table E-4. National Wildlife Refuge System Priority Resources of Concern at the Refuge

Suggested Focal Species	Habitat Type	Habitat Structure	Life History Requirement*	Other Benefiting Species
Riparian Forests: Lake Lowell and River Islands				
Yellow warbler *Dendroica petechia*	Deciduous forest and shrub	Mid- to late succession multilayered, varied forest >70% cover in shrub layer (<10 feet), subcanopy layer (>10 feet and below the canopy foliage) with subcanopy layer contributing >40% of the total cover, canopy tree closure >20% with native species including cottonwood, willow, ash, maple, red-osier dogwood, elderberry, golden currant.	Nesting, foraging, and migrating	Bald eagle, wood duck, Lewis's woodpecker, yellow-billed cuckoo, osprey, red-tailed hawk, northern goshawk, olive-sided flycatcher, belted kingfisher, great horned owl, mourning dove, mule deer, red fox
Song sparrow *Melospiza melodia*		Early succession, continuous mesic and patchy shrub layer (3-12 feet tall) with 30%-80% cover with scattered herbaceous openings; canopy trees >12 feet covering <20%; near water. Dense underbrush and deep grass of native species including willows, elm, wild rose, golden currant, elderberry, Great basin wildrye, and bluebunch wheatgrass.	Nesting, foraging, and migrating	White-crowned sparrow, California quail, western tanager, calliope hummingbird, black-throated sparrow, gray flycatcher, vesper sparrow, savannah sparrow, common yellowthroat, western terrestrial garter snake
Marsh Wetlands				
Mallard *Anas platyrhychos*	Palustrine emergent, freshwater marsh	Seasonally flooded shallow, marsh <4-36 inches deep; flooded by irrigation inflow April through October, seasonal precipitation November through March; 30%-70% cover of emergent vegetation, native seed bearing species including cattail, bulrush spp., reed spp., smartweed, and duckweed.	Nesting, foraging, and wintering	Wood duck, great blue heron, American wigeon, black-crowned night heron, marsh wren, red-winged blackbird, yellow-headed blackbird, western meadowlark, mourning dove, barn owl, pied-billed grebe, sora, American kestrel, painted turtle
Emergent Vegetation: Lake Lowell				
Western grebe ***Aechmophorus occidentalis***	Lacustrine, littoral	Shallow-flooded emergent community characterized by 50%-75% cover of moist-soil plants (e.g., smartweeds) interspersed	Nesting and loafing	Pied-billed grebe, Clark's grebe, eared grebe, canvasback, American coot

Suggested Focal Species	Habitat Type	Habitat Structure	Life History Requirement*	Other Benefiting Species
Canada goose ***Branta canadensis***		with Baltic rush, spikerush, bulrush, salt grass, bur-reed, and cattail. Minimal human disturbance during late spring and summer.	Foraging, migrating, and wintering	Tundra swan, double-crested cormorant, caspian tern, black tern, Bonaparte's gull, glaucous gull, Franklin's gull, Sabine's gull
Mallard ***Anas platyrhychos***			Foraging, migrating, and wintering	Blue-winged teal, canvasback, ruddy duck, American wigeon, gadwall, green-winged teal, northern shoveler, redhead, common merganser, northern pintail, northern leopard frog
Shoreline Mudflats: Lake Lowell				
Long-billed dowitcher ***Limnodromus scolopaceus***	Nonpersistent; lacustrine	Sparse to no vegetation; shallow flooding (<4 inches) during winter/spring; exposed during summer/fall by water withdrawals; substrate of silt, sand, and gravel; minimal human disturbance during late spring and summer.	Foraging, loafing, and migrating	American avocet, virginia rail, sora, Baird's sandpiper, American bittern, great blue heron, killdeer, common snipe, greater yellowlegs, lesser yellowlegs, willet, least bittern, western sandpiper, semi-palmated plover, black-bellied plover, cattle egret, white-faced ibis, great egret, solitary sandpiper, Wilson's phalarope
Open Water: Lake Lowell				
American white pelican ***Pelecanus erythrorhynchos***	Lacustrine; limnetic	Unconsolidated, open deep water with abundant fish; open water adjacent to emergent vegetation; minimal human disturbance.	Foraging, loafing, and migratory	Osprey, bald eagle, common loon, Clark's grebe, common merganser, double-crested cormorant, Canada goose, mallard, California gull, caspian tern, ring-billed gull, black tern, common tern, tundra swan
Western grebe ***Aechmophorus occidentalis***				
Shrub-steppe: Lake Lowell and River Islands				
Sage thrasher ***Oreoscoptes montanus***	Reservoir uplands: shrub-steppe Tall mature sagebrush in	Unfragmented stands of sagebrush spp. >50 acres; mosaic open (5%) to moderate (25%) shrub cover; variety of ages and heights associated with patchy distribution including bitterbrush, saltbrush, rabbitbrush; open understory of bare ground, native perennial forbs	Nesting, foraging, and migrating	Swainson's hawk, northern harrier, ferruginous hawk, prairie falcon, long-billed curlew, killdeer, gray flycatcher, western meadowlark, sage sparrow, Brewer's sparrow, green-tailed

Suggested Focal Species	Habitat Type	Habitat Structure	Life History Requirement*	Other Benefiting Species
	relatively large patches	and bunchgrasses including bluebunch wheatgrass, Great basin wildrye, and Idaho fescue.		towhee, rock wren, vesper sparrow, horned lark, grasshopper sparrow, black-tailed jackrabbit, badger, yellow-bellied marmot, mountain cottontail
Loggerhead shrike ***Lanius ludovianus***		Open stands, 20-40 acres of sagebrush, bitterbrush, greasewood, native shrub, and small trees >50 inches with low ground cover; flat topography <10% grade; near thick patches of shrub; short native grassland.		
Canada goose ***Branta canadensis***	Riverine islands: shrub-steppe Permanent cover of sagebrush; semipermanent, emergent willow	Tall shrub cover <3% consisting of dense residual vegetation; mix of tall native grasses, forbs, and low shrub cover; <50 m from wetlands/open water. Vegetation including sagebrush spp., fourwing saltbush, rabbitbrush spp., golden currant, wild rose, willow spp., Great basin wildrye, bluebunch wheatgrass, Indian ricegrass, western wheatgrass, and smooth brome.	Nesting, wintering, and migrating	Black rosy-finch, gray rosy-finch, green-tailed towhee, yellow-breasted chat, rock wren, canyon wren, vesper sparrow, cliff swallow, chukar, red-tailed hawk, golden eagle, bank swallow, white-throated swift, raccoon, mink
Mallard ***Anas platyrhychos***				
Agricultural				
Canada goose ***Branta canadensis***	Agricultural pastures, croplands	Short grass/alfalfa (<6 inches); winter wheat/barley (4-6 inches average winter vegetation height), ryegrass preferred (>30%), small pastures <100 acre patch size adjacent to wetlands. Residual crops of corn; cropland area buffered by at least 250 meters to minimize human disturbance.	Foraging, wintering, and migrating	Greater white-fronted goose, Ross's goose, common goldeneye, great blue heron, American wigeon, barn owl, short-eared owl, Swainson's hawk, red-tailed hawk, coyote, montane vole, mule deer, red fox, mountain cottontail
Mallard ***Anas platyrhychos***				

*"Life History Requirement" column only reflects focal species.

Table E-5. Current List of Wildlife and Plants of Deer Flat National Wildlife Refuge

Common Name	Family	Genus	Species
Silver maple	Aceraceae	*Acer*	*saccharium*
Water plantain	Alismataceae	*Alisma*	sp.
Tumble pigweed	Amaranthaceae	*Amaranthus*	*albus*
Palmer amaranth pigweed	Amaranthaceae	*Amaranthus*	*palmeri*
Redroot pigweed	Amaranthaceae	*Amaranthus*	*retroflexus*
Smooth sumac	Anacardiaceae	*Rhus*	*glabra*
Skunkbush sumac	Anacardiaceae	*Rhus*	*trilobata*
Poison ivy	Angcardiaceae	*Rhus*	*radicans*
Water hemlock	Apiaceae	*Cicuta*	*douglasii*
Poison hemlock	Apiaceae	*Conivum*	*maculatum*
Fern-leaved desert parsley	Apiaceae	*Lomatium*	*dissectum*
Indian hemp dogbane	Apocynaceae	*Apocynum*	*cannabinum*

Common Name	Family	Genus	Species
Showy milkweed	Asclepiadaceae	*Ascelepias*	*speciosa*
Mexican whorled milkweed	Asclepiadaceae	*Asclepias*	*fascicularis*
False dandelion	Asteraceae	*Agoseris*	*glauca*
Common burdock	Asteraceae	*Arctium*	*minus*
Silver sage	Asteraceae	*Artemisia*	*cana*
Basin big sagebrush	Asteraceae	*Artemisia*	*tridentata trindentata*
Wyoming sagebrush	Asteraceae	*Artemisia*	*tridentata wyomingensis*
Musk thistle	Asteraceae	*Carduus*	*nutans*
Spotted knapweed	Asteraceae	*Centaurea*	*stoebe*
Rush skeletonweed	Asteraceae	*Chondrilla*	*juncea*
Gray rabbitbrush	Asteraceae	*Chrysothamnus*	*nauseosus*
Green rabbitbrush	Asteraceae	*Chrysothamnus*	*viscidiflorus*
Canada thistle	Asteraceae	*Cirsium*	*arvense*
Bull thistle	Asteraceae	*Cirsium*	*vulgare*
Hawskbeard	Asteraceae	*Crepis*	*acumenata*
Curlycup gumweed	Asteraceae	*Grindelia*	*squarrosa*
Snakeweed	Asteraceae	*Gutierrezia*	*sarothrae*
Common sunflower	Asteraceae	*Helianthus*	*annuus*
Poverty weed	Asteraceae	*Iva*	*axillaris*
Marsh elder	Asteraceae	*Iva*	*xanthifolia*
Prickly lettuce	Asteraceae	*Lactuca*	*serriola*
Purple aster	Asteraceae	*Machaeranthera*	*canescens*
Scotch thistle	Asteraceae	*Onopordum*	*acanthium*
Goldenrod	Asteraceae	*Solidago*	spp.
Common sowthistle	Asteraceae	*Sonchus*	*oleraceus*
Dandelion	Asteraceae	*Taraxacum*	*officinale*
Spiny horsebrush	Asteraceae	*Tetradymia*	*spinosa*
Western yellow salsify	Asteraceae	*Tragopogon*	*dubius*
Common cocklebur	Asteraceae	*Xanthium*	*strumarium*
Fiddleneck	Boraginaceae	*Amsinckia*	*menziesii*
Fiddleneck	Boraginaceae	*Amsinckia*	*retrorsa*
Wintercress	Brassicaceae	*Barbarea*	*orthoceras*
Shepherd's purse	Brassicaceae	*Capsella*	*bursa-pastoris*
Hoary cress	Brassicaceae	*Cardaria*	*draba*
Blue mustard	Brassicaceae	*Chorispora*	*tenella*
Pinnate tansy mustard	Brassicaceae	*Descurainia*	*pinnata*
Spring draba	Brassicaceae	*Draba*	*verna*
Whitetop	Brassicaceae	*Lepidium*	*draba*
Broadleaved pepperweed	Brassicaceae	*Lepidium*	*latifolium*
Clasping pepperweed	Brassicaceae	*Lepidium*	*perfoliatum*
Yellowcress	Brassicaceae	*Rorippa*	sp.
Tumblemustard	Brassicaceae	*Sisymbrium*	*altissimum*
Field pennycress	Brassicaceae	*Thlaspi*	*arvense*
Prickly pear cactus	Cactaceae	*Opuntia*	*polycantha*
Blue elderberry	Caprifoliaceae	*Sambucus*	*nigra* ssp. *Cerulea*
Jagged chickweed	Caryophyllaceae	*Holosteum*	*umbellatum*
Fourwing saltbush	Chenopodiaceae	*Atriplex*	*canescens*
Kochia	Chenopodiaceae	*Bassia*	sp.
Common lambsquarter	Chenopodiaceae	*Chenopodium*	*album*
Spiny hopsage	Chenopodiaceae	*Grayii*	*spinosa*
Russian thistle	Chenopodiaceae	*Salsola*	*kali*
Greasewood	Chenopodiaceae	*Sarcobatus*	*Nees*

Common Name	Family	Genus	Species
Field bindweed	Convolvulaceae	*Convolvulus*	*arvensis*
White bryony	Cucurbitaceae	*Bryonia*	*alba*
Annual wild cucumber	Cucurbitaceae	*Echinocystis*	*lobata*
Western wild cucumber	Cucurbitaceae	*Marah*	*oreganus*
Sedge	Cyperaceae	*Carex*	spp.
Spikerush sp.	Cyperaceae	*Eleocharis*	sp.
Hard-stem bulrush	Cyperaceae	*Schoenoplectus*	*acutus*
River bulrush	Cyperaceae	*Schoenoplectus*	*fluviatilis*
Soft-stem bulrush	Cyperaceae	*Schoenoplectus*	*tabernaemontani*
Bulrush	Cyperaceae	*Scirpus*	sp.
Common teasel	Dipsacaceae	*Dipsacus*	*fullonum*
Russian olive	Elaeagnaceae	*Elaeagnus*	*angustifolia*
Small matted sandmat	Euphorbiaceae	*Chamaesyce*	*serpens*
Turkey mullein	Euphorbiaceae	*Eremocarpas*	*setigerus*
Leafy spurge	Euphorbiaceae	*Euphorbia*	*esula*
False indigo bush	Fabaceae	*Amorpha*	*fruticosa*
Packard's milkvetch	Fabaceae	*Astragalus*	*cusickii var. packardiae*
Hermit milkvetch	Fabaceae	*Astragalus*	*eremiticus*
Woollypod milkvetch	Fabaceae	*Astragalus*	*purshii ophiogenes*
Black medic	Fabaceae	*Medicago*	*lupulina*
Alfalfa	Fabaceae	*Medicago*	*sativa*
White sweet clover	Fabaceae	*Melilotus*	*albus*
Yellow sweet clover	Fabaceae	*Melilotus*	*officinalis*
Strawberry clover	Fabaceae	*Trifolium*	*fragiferum*
White clover	Fabaceae	*Trifolium*	*repens*
Storksbill	Geraniaceae	*Erodium*	*cicutarium*
Golden currant	Grossulariaceae	*Ribes*	*aureum*
Eurasian watermilfoil	Haloragaceae	*Myriophyllum*	*spicatum*
Hydrilla	Hydrocharitaceae	*Hydrilla*	*verticillata*
Yellow flag	Iridaceae	*Iris*	*pseudacorus*
Black walnut	Juglandaceae	*Juglans*	*nigra*
Catnip	Lamiaceae	*Nepeta*	*cataria*
Duckweed	Lemnaceae	*Lemna*	*minor*
Taper-tip onion	Liliaceae	*Allium*	*acuminatum*
Asparagus	Liliaceae	*Asparagus*	*officinalis*
Sego lily	Liliaceae	*Calochurtus*	*nuttallii*
Purple loosestrife	Lythraceae	*Lythrum*	*salicaria*
Common mallow	Malvaceae	*Malva*	*neglecta*
Gooseberryleaf globemallow	Malvaceae	*Sphaeralcea*	*grossulariifolia*
Munro's globemallow	Malvaceae	*Sphaeralcea*	*munroana*
White mulberry	Moraceae	*Morus*	*alba*
White ash	Oleaceae	*Fraxinus*	*americana*
Green ash	Oleaceae	*Fraxinus*	*pennsylvanica*
Tall annual willow herb	Onagraceae	*Epilobium*	*paniculatum*
Lewis's mockorange	Philadelphaceae	*Philadelphus*	*lewisii*
Broad leafed plantain	Plantaginaceae	*Plantago*	*major*
Jointed goatgrass	Poaceae	*Aegilops*	*cylindrica*
Crested wheatgrass	Poaceae	*Agropyron*	*cristatum*
Intermediate wheatgrass	Poaceae	*Agropyron*	*intermedia*
Siberian wheatgrass	Poaceae	*Agropyron*	*siberiuim*
Bluebunch wheatgrass	Poaceae	*Agropyron*	*spicata*
Rough bentgrass	Poaceae	*Agrostis*	*scabra*

Common Name	Family	Genus	Species
Wild oat	Poaceae	*Avena*	*fatua*
Smooth brome	Poaceae	*Bromus*	*inermis*
Japanese brome	Poaceae	*Bromus*	*japonicus*
Cheatgrass	Poaceae	*Bromus*	*tectorum*
Orchard grass	Poaceae	*Dactycis*	*glomerata*
Salt grass	Poaceae	*Distichlis*	*spicata*
Barnyardgrass	Poaceae	*Echinochloa*	*crus-galli*
Great basin wildrye	Poaceae	*Elymus*	*cinereus*
Bottlebrush squirreltail	Poaceae	*Elymus*	*elimoides*
Tall wheatgrass	Poaceae	*Elytrigia*	*pontica*
Tall fescue	Poaceae	*Festcua*	*arundinaceae*
Six week fescue	Poaceae	*Festcua* (*Vulpia*)	*octoflora*
Idaho fescue	Poaceae	*Festuca*	*idahoensis*
Mannagrass	Poaceae	*Glyceria*	sp.
Smooth annual barley	Poaceae	*Hordeum*	*glancum*
Foxtail barley	Poaceae	*Hordeum*	*jubatum*
Giant wildrye	Poaceae	*Leymus*	*condensatus*
Beardless wildrye	Poaceae	*Leymus*	*triticoides*
Indian ricegrass	Poaceae	*Oryzopsis*	*hymenoides*
Fall panicgrass	Poaceae	*Panicum*	*dichotomiflorum*
Western wheatgrass	Poaceae	*Pascopyrum*	*smithii*
Reed canarygrass	Poaceae	*Phalaris*	*arundinacea*
Common timothy	Poaceae	*Phleum*	*pratense*
Bulbous bluegrass	Poaceae	*Poa*	*bulbosa*
Nevada bluegrass	Poaceae	*Poa*	*nevadensis*
Kentucky bluegrass	Poaceae	*Poa*	*pratensis*
Sandberg's bluegrass	Poaceae	*Poa*	*secunda*
Rabbitfoot grass	Poaceae	*Polypogon*	*monspeliensis*
Weeping alkaligrass	Poaceae	*Puccinellia*	*distans*
Green foxtail	Poaceae	*Setaria*	*glauca*
Alkali cordgrass	Poaceae	*Spartina*	*gracilis*
Sand dropseed	Poaceae	*Sporobolus*	*cryptandrus*
Needle and thread grass	Poaceae	*Stipa*	*comata*
Medusahead	Poaceae	*Taeniatherum*	*caput-medusae*
Prickly-leaved phlox	Polemoniaceae	*Phlox*	*aculeata*
Long-leafed phlox	Polemoniaceae	*Phlox*	*longifolia*
Water smartweed	Polygonaceae	*Polygonum*	*amphibium*
Prostrate knotweed	Polygonaceae	*Polygonum*	*arenasturm*
Spotted ladysthumb	Polygonaceae	*Polygonum*	*persicaria*
Curly dock	Polygonaceae	*Rumex*	*crispis*
Willow leaves dock	Polygonaceae	*Rumex*	*salicifolius*
Common purslane	Portulacaeae	*Portulaca*	*oleracea*
Curly-leaf pondweed	Potamogetonaceae	*Potamogeton*	*crispus*
Cursed buttercup	Ranunculaceae	*Ranunculus*	*scleratus*
Bur buttercup	Ranunculaceae	*Ranunculus*	*testiculatus*
Biennial cinquefoil	Rosaceae	*Potentilla*	*biennis*
Ornamental plum	Rosaceae	*Prunus*	spp.
Bitterbrush	Rosaceae	*Purshia*	*tridentata*
Sweetbriar rose	Rosaceae	*Rosa*	*eglanteria*
Woods' rose	Rosaceae	*Rosa*	*woodsii*
Catchweed bedstraw	Rubiaceae	*Galium*	*aparine*
Cottonwood sp.	Salicaceae	*Populus*	sp.

Common Name	Family	Genus	Species
Peachleaf willow	Salicaceae	*Salix*	*amygdaloides*
Coyote willow	Salicaceae	*Salix*	*exigua*
Pacific willow	Salicaceae	*Salix*	*lucida* spp. *lasiandra*
Willow	Salicaceae	*Salix*	*salix* spp.
Indian paintbrush	Scrophulariaceae	*Castilleja*	*mutis* spp.
Woody mullein	Scrophulariaceae	*Verbascum*	*blattaria*
Common mullein	Scrophulariaceae	*Verbascum*	*thapsus*
Water speedwell	Scrophulariaceae	*Veronica*	*anagallis-aquatica*
Virginia groundcherry	Solanaceae	*Physalis*	*virginiana*
Bittersweet nightshade	Solanaceae	*Solanum*	*dulcamara*
Black nightshade	Solanaceae	*Solanum*	*nigrum*
Simplestem bur-reed	Sparganiaceae	*Sparganium*	*erectum*
Salt cedar	Tamaricaceae	*Tamarix*	*ramosissima*
Tamarisk	Tamaricaceae	*Tamarix*	*ramosissima*
Common cattail	Typhaceae	*Typha*	*latifolia*
Chinese elm	Ulmaceae	*Ulmus*	*parvifolia*
Stinging nettle	Urticaceae	*Urtica*	*dioica*
Prostrate vervain	Verbenaceae	*Verbena*	*bracteata*
Virginia creeper	Vitaceae	*Parthenocissus*	*quinquefolia*
Riverbank grape	Vitaceae	*Vitis*	*riparia*
Puncturevine	Zygophyllaceae	*Tribulus*	*terrestris*

Mammals			
Common Name	**Family**	**Genus**	**Species**
Coyote	Canidae	*Canis*	*latrans*
Red fox	Canidae	*Vulpes*	*vulpes*
North American beaver	Castoridae	*Castor*	*canadensis*
Elk	Cervidae	*Cervus*	*canadensis*
Mule deer	Cervidae	*Odocoileus*	*hemionus*
White-tailed deer	Cervidae	*Odocoileus*	*virginianus*
Mountainvole	Cricetidae	*Microtus*	*montanus*
Deer mouse	Cricetidae	*Peromyscus*	*maniculatus*
Western harvest mouse	Cricetidae	*Reithrodontomys*	*megalotis*
Northern pocket gopher	Geomyidae	*Thomomys*	*talpoides*
Northern pocket gopher	Geomyidae	*Thomomys*	*talpoides*
Black-tailed jackrabbit	Leporidae	*Lepus*	*californicus*
Mountain cottontail	Leporidae	*Sylvilagus*	*nuttalli*
Striped skunk	Mephitidae	*Mephitis*	*mephitis*
House mouse	Muridae	*Mus*	*musculus*
North American river otter	Mustelidae	*Lontra*	*canadensis*
American mink	Mustelidae	*Neovison*	*vison*
Badger	Mustelidae	*Taxidea*	*taxus*
Raccoon	Procyonidae	*Procyon*	*lotor*
Yellow-bellied marmot	Sciuridae	*Marmota*	*flavientris*
Fox squirrel	Sciuridae	*Sciurus*	*niger*

Birds			
Common Name	**Family**	**Genus**	**Species**
Geese, Swans, and Ducks			
Wood duck	Anatidae	*Aix*	*sponsa*
Northern pintail	Anatidae	*Anas*	*acuta*
American wigeon	Anatidae	*Anas*	*americana*

Birds			
Common Name	**Family**	**Genus**	**Species**
Green-winged teal	Anatidae	*Anas*	*carolinensis*
Northern shoveler	Anatidae	*Anas*	*clypeata*
Cinnamon teal	Anatidae	*Anas*	*cyanoptera*
Blue-winged teal	Anatidae	*Anas*	*discors*
Eurasian wigeon	Anatidae	*Anas*	*penelope*
Mallard	Anatidae	*Anas*	*platyrhychos*
Gadwall	Anatidae	*Anas*	*strepera*
Greater white-fronted goose	Anatidae	*Anser*	*albifrons*
Lesser scaup	Anatidae	*Aythya*	*affinis*
Redhead	Anatidae	*Aythya*	*americana*
Ring-necked duck	Anatidae	*Aythya*	*collaris*
Greater scaup	Anatidae	*Aythya*	*marila*
Canvasback	Anatidae	*Aythya*	*valisineria*
Canada goose	Anatidae	*Branta*	*canadensis*
Bufflehead	Anatidae	*Bucephala*	*albeola*
Common goldeneye	Anatidae	*Bucephala*	*clangula*
Barrow's goldeneye	Anatidae	*Bucephala*	*islandica*
Snow goose	Anatidae	*Chen*	*caerulescens*
Ross's goose	Anatidae	*Chen*	*rossii*
Long-tailed duck	Anatidae	*Clangula*	*hyemalis*
Trumpeter swan	Anatidae	*Cygnus*	*buccinator*
Tundra swan	Anatidae	*Cygnus*	*columbianus*
Harlequin duck	Anatidae	*Histrionicus*	*histrionicus*
Hooded merganser	Anatidae	*Lophodytes*	*cucullatus*
White-winged scoter	Anatidae	*Melanitta*	*deglandi*
Common merganser	Anatidae	*Mergus*	*merganser*
Red-breasted merganser	Anatidae	*Mergus*	*serrator*
Ruddy duck	Anatidae	*Oxyura*	*jamaicensis*
Gallinaceous Birds			
California quail	Odontophoridae	*Callipepla*	*californica*
Northern bobwhite	Odontophoridae	*Colinus*	*virginianus*
Chukar	Phasianidae	*Alectoris*	*chukar*
Wild turkey	Phasianidae	*Meleagris*	*gallopavo*
Gray partridge	Phasianidae	*Perdix*	*perdix*
Ring-necked pheasant	Phasianidae	*Phasianus*	*colchicus*
Loons			
Common loon	Gaviidae	*Gavia*	*immer*
Pacific loon	Gaviidae	*Gavia*	*pacifica*
Grebes			
Clark's grebe	Podicipedidae	*Aechmophorus*	*clarkii*
Western grebe	Podicipedidae	*Aechmophorus*	*occidentalis*
Horned grebe	Podicipedidae	*Podiceps*	*auritus*
Eared grebe	Podicipedidae	*Podiceps*	*nigricollis*
Pied-billed grebe	Podicipedidae	*Podilymbus*	*podiceps*
Pelicans and Cormorants			
American white pelican	Pelecanidae	*Pelecanus*	*erythrorhynchos*
Double-crested cormorant	Phalacrocoracidae	*Phalacrocorax*	*auritus*
Bitterns, Herons, and Egrets			
Great egret	Ardeidae	*Ardea*	*alba*
Great blue heron	Ardeidae	*Ardea*	*herodias*
American bittern	Ardeidae	*Botaurus*	*lentiginosus*

Birds			
Common Name	**Family**	**Genus**	**Species**
Cattle egret	Ardeidae	*Bubulcus*	*ibis*
Green heron	Ardeidae	*Butorides*	*virescens*
Snowy egret	Ardeidae	*Egretta*	*thula*
Least bittern	Ardeidae	*Ixobrychus*	*exilis*
Black-crowned night heron	Ardeidae	*Nycticorax*	*nycticorax*
Ibis and Spoonbills			
White-faced ibis	Threskiornithidae	*Plegadis*	*chihi*
New World Vultures			
Turkey vulture	Cathartidae	*Cathartes*	*aura*
Osprey, Kites, Eagles, and Hawks			
Cooper's hawk	Accipitridae	*Accipiter*	*cooperii*
Northern goshawk	Accipitridae	*Accipiter*	*gentilis*
Sharp-shinned hawk	Accipitridae	*Accipiter*	*striatus*
Golden eagle	Accipitridae	*Aquila*	*chrysaetos*
Red-tailed hawk	Accipitridae	*Buteo*	*jamaicensis*
Rough-legged hawk	Accipitridae	*Buteo*	*lagopus*
Ferruginous hawk	Accipitridae	*Buteo*	*regalis*
Swainson's hawk	Accipitridae	*Buteo*	*swainsoni*
Northern harrier	Accipitridae	*Circus*	*cyaneus*
Bald eagle	Accipitridae	*Haleaeetus*	*leucocephalus*
Osprey	Accipitridae	*Pandion*	*haliaetus*
Falcons			
Merlin	Falconidae	*Falco*	*columbarius*
Prairie falcon	Falconidae	*Falco*	*mexicanus*
Peregrine falcon	Falconidae	*Falco*	*peregrinus*
Gyrfalcon	Falconidae	*Falco*	*rusticolus*
American kestrel	Falconidae	*Falco*	*sparverius*
Rails			
American coot	Rallidae	*Fulica*	*americana*
Sora	Rallidae	*Porzana*	*carolina*
Virginia rail	Rallidae	*Rallus*	*limicola*
Cranes			
Sandhill crane	Gruidae	*Grus*	*canadensis*
Plovers			
Snowy plover	Charadriidae	*Charadrius*	*nivosus*
Semi-palmated plover	Charadriidae	*Charadrius*	*semipalmatus*
Killdeer	Charadriidae	*Charadrius*	*vociferus*
American golden plover	Charadriidae	*Pluvialis*	*dominica*
Black-bellied plover	Charadriidae	*Pluvialis*	*squatarola*
Stilts and Avocets			
Black-necked stilt	Recurvirostridae	*Himantopus*	*mexicanus*
American avocet	Recurvirostridae	*Recurvirostra*	*americana*
Sandpipers			
Spotted sandpiper	Scolopacidae	*Actitis*	*macularius*
Sanderling	Scolopacidae	*Calidris*	*alba*
Dunlin	Scolopacidae	*Calidris*	*alpina*
Baird's sandpiper	Scolopacidae	*Calidris*	*bairdii*
Stilt sandpiper	Scolopacidae	*Calidris*	*himantopus*
Western sandpiper	Scolopacidae	*Calidris*	*mauri*
Pectoral sandpiper	Scolopacidae	*Calidris*	*melanotos*
Least sandpiper	Scolopacidae	*Calidris*	*minutilla*

Birds			
Common Name	**Family**	**Genus**	**Species**
Semipalmated sandpiper	Scolopacidae	*Calidris*	*pusilla*
Short-billed dowitcher	Scolopacidae	*Limnodromus*	*griseus*
Long-billed dowitcher	Scolopacidae	*Limnodromus*	*scolopacrus*
Marbled godwit	Scolopacidae	*Limosa*	*fedoa*
Red Knot	Scolopacidae	*Calidris*	*canutus*
Long-billed curlew	Scolopacidae	*Numenius*	*americanus*
Lesser yellowlegs	Scolopacidae	*Tringa*	*flavipes*
Greater yellowlegs	Scolopacidae	*Tringa*	*melanoleuca*
Willet	Scolopacidae	*Tringa*	*semipalmata*
Solitary sandpiper	Scolopacidae	*Tringa*	*solitaria*
Snipe			
Wilson’s snipe	Scolopacidae	*Gallinago*	*delicata*
Phalaropes			
Red-necked phalarope	Scolopacidae	*Phalaropus*	*lobatus*
Wilson’s phalarope	Scolopacidae	*Phalaropus*	*tricolor*
Gulls and Terns			
California gull	Laridae	*Larus*	*californicus*
Ring-billed gull	Laridae	*Larus*	*delawarensis*
Lesser Black-backed gull	Laridae	*Larus*	*fuscus*
Glaucous-winged gull	Laridae	*Larus*	*glaucescens*
Bonaparte’s gull	Laridae	*Larus*	*philadelphia*
Franklin’s gull	Laridae	*Larus*	*pipixcan*
Herring gull	Laridae	*Larus*	*smithsonianus*
Thayer's gull	Laridae	*Larus*	*thayeri*
Forster’s tern	Laridae	*Sterna*	*forsteri*
Sabine’s gull	Laridae	*Xema*	*sabini*
Black tern	Sternidae	*Chlidonias*	*niger*
Caspian tern	Sternidae	*Hydroprogne*	*caspia*
Common tern	Sternidae	*Sterna*	*hirundo*
Doves			
Rock dove	Columbidae	*Columba*	*livia*
Eurasian collared dove	Columbidae	*Streptopelia*	*decaocto*
Mourning dove	Columbidae	*Zenaida*	*macroura*
Cuckoos			
Yellow-billed cuckoo	Cuculidae	*Coccyzus*	*americanus*
Owls			
Northern saw-whet owl	Strigidae	*Aegolius*	*acadicus*
Short-eared owl	Strigidae	*Asio*	*flammeus*
Long-eared owl	Strigidae	*Asio*	*otus*
Burrowing owl	Strigidae	*Athene*	*cunicularia*
Snowy owl	Strigidae	*Bubo*	*scandiacus*
Great horned owl	Strigidae	*Bubo*	*virginianus*
Northern pygmy-owl	Strigidae	*Glaucidium*	*gnoma*
Western screech owl	Strigidae	*Megascops*	*kennicottii*
Flammulated owl	Strigidae	*Otus*	*flammeolus*
Barred owl	Strigidae	*Strix*	*varia*
Barn owl	Tytonidae	*Tyto*	*alba*
Nightjars			
Common nighthawk	Caprimulgidae	*Chordeiles*	*minor*
Common poorwill	Caprimulgidae	*Phalaenoptilus*	*nuttallii*

Birds			
Common Name	**Family**	**Genus**	**Species**
Swifts			
White-throated swift	Apodidae	*Aeronautes*	*saxatalis*
Vaux's swift	Apodidae	*Chaetura*	*vauxi*
Hummingbirds			
Black-chinned hummingbird	Trochilidae	*Archilochus*	*alexandri*
Broad-tailed hummingbird	Trochilidae	*Selasphorus*	*platycercus*
Rufous hummingbird	Trochilidae	*Selasphorus*	*rufus*
Calliope hummingbird	Trochilidae	*Stellula*	*calliope*
Kingfishers			
Belted kingfisher	Cerylidae	*Megaceryle*	*alcyon*
Woodpeckers			
Northern flicker	Picidae	*Colaptes*	*auratus*
Lewis's woodpecker	Picidae	*Melanerpes*	*lewis*
Downy woodpecker	Picidae	*Picoides*	*pubescens*
Hairy woodpecker	Picidae	*Picoides*	*villosus*
Flycatchers			
Olive-sided flycatcher	Tyrannidae	*Cantopus*	*cooperii*
Western wood-pewee	Tyrannidae	*Contopus*	*sordidulus*
Cordilleran	Tyrannidae	*Empidonax*	*occidentalis*
Willow flycatcher	Tyrannidae	*Empidonax*	*trailii*
Gray flycatcher	Tyrannidae	*Empidonax*	*wrightii*
Ash-throated flycatcher	Tyrannidae	*Myiarchus*	*cinerascens*
Say's phoebe	Tyrannidae	*Sayornis*	*saya*
Eastern kingbird	Tyrannidae	*Tyrannus*	*tyrannus*
Western kingbird	Tyrannidae	*Tyrannus*	*verticalis*
Shrikes			
Northern shrike	Laniidae	*Lanius*	*excubitor*
Loggerhead shrike	Laniidae	*Lanius*	*ludovicianus*
Vireos			
Cassin's vireo	Vireonidae	*Vireo*	*cassinii*
Warbling vireo	Vireonidae	*Vireo*	*gilvus*
Red-eyed vireo	Vireonidae	*Vireo*	*olivaceus*
Plumbeous vireo	Vireonidae	*Vireo*	*plumbeus*
Jays, Magpies, and Crows			
American crow	Corvidae	*Corvus*	*brachyrhynchos*
Common raven	Corvidae	*Corvus*	*corax*
Blue jay	Corvidae	*Cyanocitta*	*cristata*
Steller's jay	Corvidae	*Cyanocitta*	*stelleri*
Black-billed magpie	Corvidae	*Pica*	*hudsonia*
Larks			
Horned lark	Alaudidae	*Eremophila*	*alpestris*
Swallows			
Barn swallow	Hirundinidae	*Hirundo*	*rustica*
Cliff swallow	Hirundinidae	*Petrochelidon*	*pyrrhonota*
Bank swallow	Hirundinidae	*Riparia*	*riparia*
Northern rough-winged swallow	Hirundinidae	*Stelgidopteryx*	*serripennis*
Tree swallow	Hirundinidae	*Tachycineta*	*bicolor*
Violet-green swallow	Hirundinidae	*Tachycineta*	*thalassina*
Chickadees			
Black-capped chickadee	Paridae	*Poecile*	*atricapillus*
Mountain chickadee	Paridae	*Poecile*	*gambeli*

Birds			
Common Name	**Family**	**Genus**	**Species**
Bushtits			
Bushtit	Aegithalidae	*Psaltriparus*	*minimus*
Nuthatches			
Red-breasted nuthatch	Sittidae	*Sitta*	*canadensis*
White-breasted nuthatch	Sittidae	*Sitta*	*carolinensis*
Creepers			
Brown creeper	Certhidae	*Certhia*	*americana*
Wrens			
Canyon wren	Troglodytidae	*Catherpes*	*mexicanus*
Marsh wren	Troglodytidae	*Cistothorus*	*palustris*
Rock wren	Troglodytidae	*Salpinctes*	*obsoletus*
House wren	Troglodytidae	*Troglodytes*	*aedon*
Pacific wren	Troglodytidae	*Troglodytes*	*pacificus*
Kinglets, Bluebirds, and Thrushes			
Golden-crowned kinglet	Regulidae	*Regulus*	*satrapa*
Ruby-crowned kinglet	Sylviidae	*Regulus*	*calendula*
Hermit thrush	Turdidae	*Catharus*	*guttatus*
Swainson's thrush	Turdidae	*Catharus*	*ustulatus*
Varied thrush	Turdidae	*Ixoreus*	*naevius*
Townsend's solitaire	Turdidae	*Myadestes*	*townsendi*
Mountain bluebird	Turdidae	*Sialia*	*currucoides*
Western bluebird	Turdidae	*Sialia*	*mexicana*
American robin	Turdidae	*Turdus*	*migratorius*
Mockingbirds and Thrashers			
Gray catbird	Mimidae	*Dumetella*	*carolinensis*
Northern mockingbird	Mimidae	*Mimus*	*polyglottos*
Sage thrasher	Mimidae	*Oeroscoptes*	*montanus*
Starlings			
European starling	Sturnidae	*Sturnus*	*vulgaris*
Pipits			
American pipit	Motacillidae	*Anthus*	*rubescens*
Waxwings			
Cedar waxwing	Bombycillidae	*Bombycilla*	*cedrorum*
Bohemian waxwing	Bombycillidae	*Bombycilla*	*garrulus*
Warblers			
Yellow warbler	Parulidae	*Dendroica*	*petechia*
Townsend's warbler	Parulidae	*Dendroica*	*townsendi*
Common yellowthroat	Parulidae	*Geothlypis*	*trichas*
Yellow-breasted chat	Parulidae	*Icteria*	*virens*
MacGillivray's warbler	Parulidae	*Oporornis*	*tolmiei*
Orange-crowned warbler	Parulidae	*Oreothlypis*	*celata*
Nashville warbler	Parulidae	*Oreothlypis*	*ruficapilla*
Yellow-rumped warbler	Parulidae	*Setophaga*	*coronata*
Wilson's warbler	Parulidae	*Wilsonia*	*pusilla*
Towhees and Sparrows			
Lapland longspur	Calcariidae	*Calcarius*	*lapponicus*
Snow bunting	Calcariidae	*Plectrophenax*	*nivalis*
Grasshopper sparrow	Emberizidae	*Ammodramus*	*savannarum*
Sage sparrow	Emberizidae	*Amphispiza*	*belli*
Black-throated sparrow	Emberizidae	*Amphispiza*	*bilineata*
Lark sparrow	Emberizidae	*Chondestes*	*grammacus*

Birds			
Common Name	**Family**	**Genus**	**Species**
Dark-eyed junco	Emberizidae	*Junco*	*hyemalis*
Lincoln's sparrow	Emberizidae	*Melospiza*	*lincalnii*
Song sparrow	Emberizidae	*Melospiza*	*melodia*
Savannah sparrow	Emberizidae	*Passerculus*	*sandwichensis*
Fox sparrow	Emberizidae	*Passerella*	*iliaca*
Green-tailed towhee	Emberizidae	*Pipilo*	*chlorurus*
Spotted towhee	Emberizidae	*Pipilo*	*maculatus*
Vesper sparrow	Emberizidae	*Pooecetes*	*gramineus*
American tree sparrow	Emberizidae	*Spizella*	*arborea*
Brewer's sparrow	Emberizidae	*Spizella*	*breweri*
Chipping sparrow	Emberizidae	*Spizella*	*passerina*
White-throated sparrow	Emberizidae	*Zonotrichia*	*albicollis*
White-crowned sparrow	Emberizidae	*Zonotrichia*	*leucophrys*
Harris' sparrow	Emberizidae	*Zonotrichia*	*querula*
Grosbeaks and Allies			
Lazuli bunting	Cardinalidae	*Passerina*	*amoena*
Indigo bunting	Cardinalidae	*Passerina*	*cyanea*
Black-headed grosbeak	Cardinalidae	*Pheuctius*	*melanocephalus*
Western tanager	Cardinalidae	*Piranga*	*ludoviciana*
Blackbirds and Orioles			
Red-winged blackbird	Icteridae	*Agelaius*	*phoeniceus*
Brewer's blackbird	Icteridae	*Euphagus*	*cyanocephalus*
Bullock's oriole	Icteridae	*Icterus*	*bullockii*
Brown-headed cowbird	Icteridae	*Molothrus*	*ater*
Great-tailed grackle	Icteridae	*Quiscalus*	*mexicanus*
Common grackle	Icteridae	*Quiscalus*	*quiscula*
Western meadowlark	Icteridae	*Sturnella*	*neglecta*
Yellow-headed blackbird	Icteridae	*Xanthocephalus*	*xanthocephalus*
Finches			
Common redpoll	Fringillidae	*Carduelis*	*flammea*
Pine siskin	Fringillidae	*Carduelis*	*pinus*
American goldfinch	Fringillidae	*Carduelis*	*tristis*
Cassin's finch	Fringillidae	*Carpodacus*	*cassinii*
House finch	Fringillidae	*Carpodacus*	*mexicanus*
Evening grosbeak	Fringillidae	*Coccothraustes*	*vespertinus*
Black rosy-finch	Fringillidae	*Leucosticte*	*atrata*
Gray-crowned rosy-finch	Fringillidae	*Leucosticte*	*tephrocotis*
Weaver Finches			
House sparrow	Passeridae	*Passer*	*domesticus*

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Cockroach	Blattaria (cockroaches)	Blatellidae		
Comb-clawed beetle	Coleoptera (Beetles)	Alleculidae		
	Coleoptera (Beetles)	Anobiidae		
Ant-like flower beetle	Coleoptera (Beetles)	Anthicidae		
Fungus weevils	Coleoptera (Beetles)	Anthribididae		
Seed beetle	Coleoptera (Beetles)	Bruchidae		
Metallic wood-boring beetle	Coleoptera (Beetles)	Buprestidae		
Soldier beetle	Coleoptera (Beetles)	Cantharidae		
Ground beetle	Coleoptera (Beetles)	Carabidae		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Brown sawyer beetle	Coleoptera (Beetles)	Cerambycidae		
Milkweed long-horned beetle	Coleoptera (Beetles)	Cerambycidae	*Tetraopes*	*tetraophthalmus*
Flea beetle	Coleoptera (Beetles)	Chrysomelidae		
Case-bearing leaf beetle	Coleoptera (Beetles)	Chrysomelidae		
Milkweed leaf beetle	Coleoptera (Beetles)	Chrysomelidae	*Chrysochus*	*colbaltinus*
Asparagus leaf beetle	Coleoptera (Beetles)	Chrysomelidae	*Crioceris*	*asparagi*
Spotted asparagus beetle	Coleoptera (Beetles)	Chrysomelidae	*Crioceris*	*Duodecimpunc-tata*
Spotted cucumber leaf beetle	Coleoptera (Beetles)	Chrysomelidae	*Diabrotica*	spp.
Elm leaf beetle	Coleoptera (Beetles)	Chrysomelidae	*Galerucella*	*luteola*
Gray tiger beetle	Coleoptera (Beetles)	Cicindelidae		
Ornate checkered beetle	Coleoptera (Beetles)	Cleridae	*Trichodes*	*ornatus*
Ladybird beetle (no spots)	Coleoptera (Beetles)	Coccinellidae		
Ladybird beetle (orange; seven spots per elytron	Coleoptera (Beetles)	Coccinellidae		
Ladybird beetle (black with cream spots)	Coleoptera (Beetles)	Coccinellidae		
Ladybird beetle	Coleoptera (Beetles)	Coccinellidae	*Hippodamia*	*convergens*
Water boatman	Coleoptera (Beetles)	Corixidae		
Tiny fungus beetle	Coleoptera (Beetles)	Cryptophagidae		
Weevil	Coleoptera (Beetles)	Curculionidae		
Skin beetle	Coleoptera (Beetles)	Dermestidae		
Diving beetle	Coleoptera (Beetles)	Dytiscidae		
Click beetle (dark brown species)	Coleoptera (Beetles)	Elateridae		
Mud-loving beetle	Coleoptera (Beetles)	Heteroceridae		
Water scavenger beetle	Coleoptera (Beetles)	Hydrophillidae		
Minute scavenger beetle	Coleoptera (Beetles)	Latridiidae		
Blister beetle	Coleoptera (Beetles)	Meloidae	*Nemognatha*	spp.
Soft winged flower beetle	Coleoptera (Beetles)	Melyridae		
Tumbling flower beetle	Coleoptera (Beetles)	Mordellidae		
Sap beetle (brown/ orange spots on elytra)	Coleoptera (Beetles)	Nitidulidae		
Backswimmer	Coleoptera (Beetles)	Notonectidae		spp.
Scarab beetle (black species)	Coleoptera (Beetles)	Scarabaeidae		
May beetle	Coleoptera (Beetles)	Scarabaeidae	*Phyllophaga*	sp.
False darkling beetle	Coleoptera (Beetles)	Seraptiidae		
Rove beetle	Coleoptera (Beetles)	Staphylinidae		
Darkling beetle	Coleoptera (Beetles)	Tenebrionidae		
European earwig	Dermaptera (Earwigs)	Forficulidae	*Forficula*	*auricularia*
Deer fly	Diptera (Flies)			
Robber fly	Diptera (Flies)	Asilidae		
Small minnow mayfly	Diptera (Flies)	Baetidae		
March flies	Diptera (Flies)	Bibionidae		
Bee fly (two spots on each wing)	Diptera (Flies)	Bombyliidae		
Bee fly (brown coastal edge species)	Diptera (Flies)	Bombyliidae		
Green bottle fly	Diptera (Flies)	Calliforidae		
Bitting midge	Diptera (Flies)	Ceratopogonidae		
Midge (small green species)	Diptera (Flies)	Chironomidae		
Grass flies	Diptera (Flies)	Chloropidae		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Mosquitoes	Diptera (Flies)	Culicidae		
Long-legged fly (gray species)	Diptera (Flies)	Dolichopodidae		
Dance flies	Diptera (Flies)	Empididae		
	Diptera (Flies)	Muscidae		
House fly	Diptera (Flies)	Muscoididae		
Fungus gnat (brown)	Diptera (Flies)	Mycetophilidae		
Hump-backed flies	Diptera (Flies)	Phoridae		
Moth fly	Diptera (Flies)	Psychodidae		
Dung flies	Diptera (Flies)	Sarcophagidae		
Dark-winged fungus gnat	Diptera (Flies)	Sciaridae		
Soldier fly (metallic green species)	Diptera (Flies)	Stratiomyiidae		
Flower flies	Diptera (Flies)	Syrphidae		
Tachinid fly	Diptera (Flies)	Tachinidae		
Fruit fly (black-wing/red abdomen/green eyes)	Diptera (Flies)	Tephritidae		
Fruit fly (metallic green abdomen/clear wing species)	Diptera (Flies)	Tephritidae		
Stiletto fly	Diptera (Flies)	Therevidae		
Crane fly	Diptera (Flies)	Tipulidae		
Small minnow mayfly	Ephemoroptera	Baetidae		
Minute pirate bug	Hemiptera (True Bugs)	Anthocoridae		
Stilt bugs	Hemiptera (True Bugs)	Berytidae		
Broad-headed bug	Hemiptera (True Bugs)	Coriscidae		
Water boatman	Hemiptera (True Bugs)	Corixidae		
Scentless plant bug	Hemiptera (True Bugs)	Corizidae		
Big-eyed bugs	Hemiptera (True Bugs)	Geocoridae		
Water strider	Hemiptera (True Bugs)	Gerridae		
Seed bug (small gray species)	Hemiptera (True Bugs)	Lygaeidae		
Western big-eyed bug	Hemiptera (True Bugs)	Lygaeidae	*Geocoris*	*pallens*
Small milkweed bug	Hemiptera (True Bugs)	Lygaeidae	*Lygaeus*	*kalmii*
Tarnished plant bug	Hemiptera (True Bugs)	Miridae	*Lygus*	*lineolaris*
Damsel bug	Hemiptera (True Bugs)	Nabidae		
Backswimmer	Hemiptera (True Bugs)	Notonectidae		
Stink bug (green species)	Hemiptera (True Bugs)	Pentatomidae		
Rough plant bug	Hemiptera (True Bugs)	Pentatomidae	*Brochymena*	sp.
Ambush bug	Hemiptera (True Bugs)	Phymatidae	*Phymata*	*americana*
Assassin bug (gray/tan species)	Hemiptera (True Bugs)	Reduviidae		
Shore bug	Hemiptera (True Bugs)	Saldidae		
Aphids	Homoptera (Aphids and Relatives)	Aphididae		
Leafhopper nymphs (gray with white stripe)	Homoptera (Aphids and Relatives)	Cicadellidae		
Delphacid planthopper	Homoptera (Aphids and Relatives)	Delphacidae		
Jumping plantlice (tiny tan/green species)	Homoptera (Aphids and Relatives)	Psyllidae		
	Hymenoptera (Bees, Wasps and Ants)		*Aphaenogaster*	sp.
	Hymenoptera (Bees, Wasps and Ants)		*Forelius*	*pruinosus* (*Royer*)

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
	Hymenoptera (Bees, Wasps and Ants)	Aphelinidae		
Honey bee	Hymenoptera (Bees, Wasps and Ants)	Apidae	*Apis*	*mellifera*
Honey bee	Hymenoptera (Bees, Wasps and Ants)	Apidae	*Apis*	*mellifera*
Large bumble bee	Hymenoptera (Bees, Wasps and Ants)	Apidae	*Bombus*	sp.
Longhorn bee	Hymenoptera (Bees, Wasps and Ants)	Apidae	*Melissodes*	sp.
	Hymenoptera (Bees, Wasps and Ants)	Bethylidae		
Braconid wasp	Hymenoptera (Bees, Wasps and Ants)	Braconidae		
	Hymenoptera (Bees, Wasps and Ants)	Chalcidae		
Cuckoo wasp	Hymenoptera (Bees, Wasps and Ants)	Chrysididae		
Gall wasp	Hymenoptera (Bees, Wasps and Ants)	Cynipidae		
	Hymenoptera (Bees, Wasps and Ants)	Diapriidae		
	Hymenoptera (Bees, Wasps and Ants)	Encyrtidae		
	Hymenoptera (Bees, Wasps and Ants)	Eulophidae		
	Hymenoptera (Bees, Wasps and Ants)	Eupelmidae		
	Hymenoptera (Bees, Wasps and Ants)	Figitidae		
Thatch/Wood ant	Hymenoptera (Bees, Wasps and Ants)	Formicidae	*Formica*	*rufa* spp.
Big headed ant	Hymenoptera (Bees, Wasps and Ants)	Formicidae	*Pheidole*	
Owyhee harvester ant	Hymenoptera (Bees, Wasps and Ants)	Formicidae	*Pogonomyrmex*	*salinus*
Odorous house ant	Hymenoptera (Bees, Wasps and Ants)	Formicidae	*Tapinoma*	*sessile*
Pavement ant	Hymenoptera (Bees, Wasps and Ants)	Formicidae	*Tetramorium*	*caespitum*
Flower bee (red-yellow abdomen)	Hymenoptera (Bees, Wasps and Ants)	Halictidae		
Sweat bee (blue-green head)	Hymenoptera (Bees, Wasps and Ants)	Halictidae		
Parasitic ichneumon wasp (orange/black-wing species)	Hymenoptera (Bees, Wasps and Ants)	Ichneumonidae		
Parasitic ichneumon wasp	Hymenoptera (Bees, Wasps and Ants)	Ichneumonidae	*Ophion*	sp.
Leaf-cutting bee	Hymenoptera (Bees, Wasps and Ants)	Megachilidae		
Velvet ant	Hymenoptera (Bees, Wasps and Ants)	Mutillidae		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Fairy flies	Hymenoptera (Bees, Wasps and Ants)	Mymaridae		
	Hymenoptera (Bees, Wasps and Ants)	Perilampidae		
Spider wasp	Hymenoptera (Bees, Wasps and Ants)	Pompillidae		
	Hymenoptera (Bees, Wasps and Ants)	Pteromalidae		
Hunting wasp	Hymenoptera (Bees, Wasps and Ants)	Sphecidae		
Thread-waisted wasp	Hymenoptera (Bees, Wasps and Ants)	Sphecidae	*Ammophilia*	spp.
Sand wasp	Hymenoptera (Bees, Wasps and Ants)	Sphecidae	*Bembix*	*americana*
Caterpillar wasp	Hymenoptera (Bees, Wasps and Ants)	Sphecidae	*Podalonia*	spp.
Tiphiid wasp (brown species)	Hymenoptera (Bees, Wasps and Ants)	Tiphiidae		
Paper wasp	Hymenoptera (Bees, Wasps and Ants)	Vespidae	*Polistes*	*fuscatus*
Western hornet	Hymenoptera (Bees, Wasps and Ants)	Vespidae	*Vespula*	*pennsylvanica*
Termites	Isoptera			
Ochre ringlet	Lepidoptera (Butterflies and Moths)		*Coenonympha*	*tullia*
Northern white skipper	Lepidoptera (Butterflies and Moths)		*Heliopetes*	*ericetorum*
Purplish copper	Lepidoptera (Butterflies and Moths)		*Lycaena*	*helloides*
Tiger moth	Lepidoptera (Butterflies and Moths)	Arctiidae		
Dogbane tiger moth	Lepidoptera (Butterflies and Moths)	Arctiidae	*Cycnia*	*tenera*
Banded woollybear moth	Lepidoptera (Butterflies and Moths)	Arctiidae	*Isia*	*isabella*
Monarch butterfly	Lepidoptera (Butterflies and Moths)	Danaidae	*Danaus*	*plexippus*
Inchworm moth	Lepidoptera (Butterflies and Moths)	Geometridae		
Western pygmy blue butterfly	Lepidoptera (Butterflies and Moths)	Lycaenidae	*Brephidium*	*exile*
Gray hairstreak butterfly	Lepidoptera (Butterflies and Moths)	Lycaenidae	*Strymon*	*melinus*
Euthesanotia-type noctuid	Lepidoptera (Butterflies and Moths)	Noctuidae		
Celery looper moth	Lepidoptera (Butterflies and Moths)	Noctuidae	*Anagrapha*	*falcifera*
Looper noctuid moth	Lepidoptera (Butterflies and Moths)	Noctuidae	*Dargida*	*procinctus*
Dart noctuid moth	Lepidoptera (Butterflies and Moths)	Noctuidae	*Euxoa*	sp.
Clandestine dart moth	Lepidoptera (Butterflies and Moths)	Noctuidae	*Spaelotis*	*clandestina*

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Beet armyworm moth	Lepidoptera (Butterflies and Moths)	Noctuidae	*Spodoptera*	*exigua*
Viceroy butterfly	Lepidoptera (Butterflies and Moths)	Nymphalidae	*Limenitis*	*archippus*
Field crescent butterfly	Lepidoptera (Butterflies and Moths)	Nymphalidae	*Phyciodes*	*campestris*
Painted lady butterfly	Lepidoptera (Butterflies and Moths)	Nymphalidae	*Vanessa*	*cardui*
Western tiger swallowtail butterfly	Lepidoptera (Butterflies and Moths)	Papilionidae	*Papilio*	*rutulus*
Cabbage white butterfly	Lepidoptera (Butterflies and Moths)	Pieridae	*Pieris*	*rapae*
Becker's white butterfly	Lepidoptera (Butterflies and Moths)	Pieridae	*Pontia*	*beckerii*
Western white butterfly	Lepidoptera (Butterflies and Moths)	Pieridae	*Pontia*	*occidentalis*
Checkered white butterfly	Lepidoptera (Butterflies and Moths)	Pieridae	*Pontia*	*protodice*
Diamondback moth	Lepidoptera (Butterflies and Moths)	Plutellidae	*Plutella*	*xylostella*
Plume moth	Lepidoptera (Butterflies and Moths)	Pterophoridae		
Corn earworm-like grass moth	Lepidoptera (Butterflies and Moths)	Pyralidae		
Crambus grass moth (gray and silver)	Lepidoptera (Butterflies and Moths)	Pyralidae		
Crambus grass moth (yellow and pearl)	Lepidoptera (Butterflies and Moths)	Pyralidae		
Diorhyctria-type grass moth	Lepidoptera (Butterflies and Moths)	Pyralidae		
Loxostege-like grass moth	Lepidoptera (Butterflies and Moths)	Pyralidae		
Tan grass moth	Lepidoptera (Butterflies and Moths)	Pyralidae		
Grass moth	Lepidoptera (Butterflies and Moths)	Pyrilidae		
Common ringlet butterfly	Lepidoptera (Butterflies and Moths)	Satyridae	*Coenonympha*	*ampelos*
Leaf-roller moth (pale yellow)	Lepidoptera (Butterflies and Moths)	Tortricidae		
Leaf-roller moth (pale yellow with brown markings)	Lepidoptera (Butterflies and Moths)	Tortricidae		
Leaf-roller moth	Lepidoptera (Butterflies and Moths)	Tortricidae	*Choristoneura*	spp.
Green lace-wing	Neuroptera (nervewings)	Chrysopidae		
Ant lion	Neuroptera (nervewings)	Myrmeleontidae		
Snakefly	Neuroptera (nervewings)	Raphidiidae		
Blue-eyed darner	Odonata (Dragonflies and Damselflies)	Aeshnidae	*Aeshna*	*multicolor*

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Narrow winged damselfly	Odonata (Dragonflies and Damselflies)	Coenagrionidae		
Gray damselfly	Odonata (Dragonflies and Damselflies)	Coenagrionidae		
Blue damselfly	Odonata (Dragonflies and Damselflies)	Coenagrionidae		
Bluet damselfly	Odonata (Dragonflies and Damselflies)	Coenagrionidae	*Enallagma*	sp.
Skimmer dragonfly (red species)	Odonata (Dragonflies and Damselflies)	Libellulidae	*Sympetrum*	spp.
Skimmer dragonfly (tan species)	Odonata (Dragonflies and Damselflies)	Libellulidae	*Sympetrum*	spp.
Saddlebag skimmer dragonfly	Odonata (Dragonflies and Damselflies)	Libellulidae	*Tramea*	spp.
Damselfly	Odonata (Dragonflies and Damselflies)	Zygopidae		
Short-horned grasshopper (gray species)	Orthoptera (Grasshoppers and Relatives)	Acrididae		
Short-horned grasshopper (gray with black and yellow hindwings; red-legged)	Orthoptera (Grasshoppers and Relatives)	Acrididae		
Short-horned grasshopper (green with white stripes)	Orthoptera (Grasshoppers and Relatives)	Acrididae		
Short-horned grasshopper (tan species)	Orthoptera (Grasshoppers and Relatives)	Acrididae		
Tree cricket	Orthoptera (Grasshoppers and Relatives)	Grillidae		
Jeruselem cricket	Orthoptera (Grasshoppers and Relatives)	Gryllacrididae		
Praying mantis	Orthoptera (Grasshoppers and Relatives)	Mantidae		
Ant cricket	Orthoptera (Grasshoppers and Relatives)	Myrmecophilidae	*Myrmecophilus*	
Pygmy grasshopper	Orthoptera (Grasshoppers and Relatives)	Tetrigidae		
Katydids	Orthoptera (Grasshoppers and Relatives)	Tettigoniidae		
Plantlouse (tiny)	Psocoptera (Plantlice and Barklice)			
Thrips	Thysanptera (thripes)			
Caddisfly (black species)	Trichoptera (Caddisflies)			
Caddisfly (small/tan/short antennae)	Trichoptera (Caddisflies)			

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
Caddisfly (medium-sized/tan/long antennae)	Trichoptera (Caddisflies)			
Caddisfly (medium-sized/ gray-brown/short antennae)	Trichoptera (Caddisflies)			
Caddisfly (medium-sized/gray/long antennae)	Trichoptera (Caddisflies)			

Fish			
Common	**Family**	**Genus**	**Species**
Largescale sucker	Catostomidae	*Catostomus*	*macrochelius*
Pumpkinseed	Centrarchidae	*Lepomis*	*gibbosus*
Bluegill	Centrarchidae	*Lepomis*	*macrochirus*
Smallmouth bass	Centrarchidae	*Micropterus*	*dolomieu*
Largemouth bass	Centrarchidae	*Micropterus*	*salmoides*
Black crappie	Centrarchidae	*Pomoxis*	*nigromaculatus*
Oriental weatherfish	Cobitidae	*Misgurnus*	*anguillicaudatus*
Common carp	Cyprinidae	*Cyprinus*	*carpio*
Northern pikeminnow	Cyprinidae	*Ptychocheilus*	*oregonensis*
Redside shiner	Cyprinidae	*Richardsonius*	*balteatus*
Brown bullhead	Ictaluridae	*Ameiurus*	*nebulosus*
Channel catfish	Ictaluridae	*Ictalurus*	*punctatus*
Yellow perch	Percidae	*Perca*	*flavescens*
Lahontan cutthroat trout	Salmonidae	*Oncorhynchus*	*larkia henshawi*
Rainbow trout	Salmonidae	*Oncorhynchus*	*mykiss*
Kokanee	Salmonidae	*Oncorhynchus*	*nerka*

Herptiles			
Common Name	**Family**	**Genus**	**Species**
Racer	Colubridae	*Coluber*	*constrictor*
Striped whipsnake	Colubridae	*Masticophis*	*taeniatus*
Gopher snake	Colubridae	*Pituophis*	*catenifer*
Bull snake	Colubridae	*Pituophis*	*melanoleucuc*
Western terrestrial garter snake	Colubridae	*Thamnophis*	*elegans*
Common garter snake	Colubridae	*Thamnophis*	*sirtalis*
Painted turtle	Emydidae	*Chrysemys*	*picta*
Pacific tree frog	Hylidae	*Pseudacris*	*regilla*
Bullfrog	Ranidae	*Rana*	*catesbeiana*
Northern leopard frog	Ranidae	*Rana*	*pipiens*
Great Basin spadefoot toad	Scaphiopodidae	*Spea*	*intermontana*
Western rattlesnake	Viperidae	*Crotalus*	*viridis*

Other			
Common Name	**Family**	**Genus**	**Species**
Water mite		*Acari*	
Free-living aquatic worm		*Nematode*	
Scud	Amphipoda		
Springtail	Collembola		
New Zealand mudsnail	Hydrobiidae	*Potamopyrgus*	*antipodarum*
Aquatic worm	Oligochaeta		
Wind scorpion	Solifudae		
Ink cap fungi	Coprinaceae	*Coprinus*	spp.

Document continues on next page.

Appendix F. Statement of Compliance

STATEMENT OF COMPLIANCE
for Implementation of the
Deer Flat National Wildlife Refuge, Headquartered in Nampa, Canyon County, Idaho
(with Refuge lands in Payette, Owyhee, and Washington Counties in Idaho; and Malheur County in Oregon)
Comprehensive Conservation Plan

The following executive orders and legislative acts have been reviewed as they apply to implementation of the Deer Flat National Wildlife Refuge (Refuge) Comprehensive Conservation Plan (CCP). See 602 FW 3, Exhibit 2 for other potential compliance requirements.

- **National Environmental Policy Act (1969) (42 U.S.C. 4321 et seq.) (NEPA).** The planning process has been conducted in accordance with NEPA Implementing Procedures and Department of the Interior and U.S. Fish and Wildlife Service (Service) procedures, and has been performed in coordination with the affected public.

  The CCP is programmatic in many respects, and specific details of certain projects and actions cannot be determined until a later date depending on funding and implementation schedules. Certain projects or actions may require additional NEPA compliance.

- **National Historic Preservation Act (1966) (16 U.S.C. 470 et seq.).** The implementation of the CCP should not affect cultural resources. The proposed action does not meet the criteria of an effect or adverse effect as an undertaking defined in 36 Code of Federal Regulations 800.9 and Service Manual 614 FW 2. The Service will comply with the National Historic Preservation Act if any management actions have the potential to affect any historic properties that may be present.

- **Executive Order 12372. Intergovernmental Review.** Coordination and consultation with affected Tribal, local, and State governments, other Federal agencies, and landowners has been completed through personal contact and/or in writing by Service planners, Refuge managers, and supervisors.

- **Executive Order 13175. Consultation and Coordination with Indian Tribal Governments.** As required under Secretary of the Interior Order 3206, American Indian Tribal Rights, Federal-Tribal Responsibilities, and the Endangered Species Act, the Project Leader attempted to consult and coordinate with the Nez Perce, Shoshone-Bannock, and Shoshone Paiute Tribes regarding the proposed action. All listed tribes were contacted in writing and by phone to assess their interest in the CCP planning process.

- **Executive Order 12898. Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.** All Federal actions must address and identify, as appropriate, disproportionally high and adverse human health or environmental effects of its programs, policies, and activities on minority populations, low-income populations, and Indian Tribes in the United States. The CCP was evaluated, and no adverse human health or environmental effects were identified for minority or low-income populations, Indian Tribes, or anyone else.

- **Wilderness Act of 1964.** The Service has evaluated the suitability of the Refuge for wilderness designation and found that no lands within the Refuge meet all necessary criteria for inclusion in the National Wilderness Preservation System.

- **National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd-668ee).** Appropriate Use Findings were prepared for boating at no-wake speeds, competitive and group cycling and jogging, individual cycling and jogging, float plan use, geocaching, grazing and farming, high-speed watercraft use, horseback riding, ice skating, remote controlled planes, research, swimming and beach use, and walking with dogs. Walking with dogs, swimming and beach use, individual cycling and jogging, boating at no-wake speeds, horseback riding, and high-speed watercraft use were all found to be appropriate when following stipulations set forth in the compatibility determination for each use. Compatibility determinations were also prepared for fishing, hunting, wildlife observation, photography, interpretation, and environmental education. All wildlife-dependent activities and appropriate nonwildlife-dependent activities were found to be compatible with stipulations.

- **Executive Order 13186. Responsibilities of Federal Agencies to Protect Migratory Birds.** The CCP is consistent with Executive Order 13186 because the CCP and NEPA analyses evaluate the effects of agency actions on migratory birds.

- **Endangered Species Act of 1973 (16 U.S.C. 1531-1544).** CCP implementation is expected to result in findings of no significant action.

- **Executive Order 11990. Protection of Wetlands.** The CCP is consistent with Executive Order 11990 because CCP implementation would protect existing wetlands.

- **Integrated Pest Management, 517 DM 1 and 7 RM 14.** In accordance with 517 DM 1 and 7 RM 14, an integrated pest management (IPM) approach has been adopted to eradicate, control, or contain pest and invasive species on the Refuge. In accordance with 517 DM 1, only pesticides registered with the U.S. Environmental Protection Agency (EPA) in full compliance with the Federal Insecticide, Fungicide, and Rodenticide Act and as provided in regulations, orders, or permits issued by EPA may be applied on lands and waters under refuge jurisdiction.

_____ _____

Project Leader, Southeast Idaho National Wildlife Refuge Complex — Date

Appendix G. Integrated Pest Management (IPM) Program

G.1 Background

IPM is an interdisciplinary approach using methods to prevent, eliminate, contain, and/or control pest species in concert with other management activities on refuge lands and waters to achieve wildlife and habitat management goals and objectives. IPM is also a scientific, adaptive management process where available scientific information and best professional judgment of the refuge staff and other resource experts would be used to identify and implement appropriate management strategies that can be modified and/or changed over time to ensure effective, site-specific management of pest species to achieve desired outcomes. In accordance with 43 Code of Federal Regulations (C.F.R.) 46.145, adaptive management would be particularly relevant where long-term impacts may be uncertain and future monitoring would be needed to make adjustments in subsequent implementation decisions. After a tolerable pest population (threshold) is determined considering achievement of refuge resource objectives and the ecology of pest species, one or more methods, or combinations thereof, would be selected that are feasible, efficacious, and most protective of non-target resources, including native species (fish, wildlife, and plants), and Service personnel, Service authorized agents, volunteers, and the public. Staff time and available funding would be considered when determining feasibility/practicality of various treatments.

IPM techniques to address pests are presented as comprehensive conservation plan (CCP) strategies (see Chapter 2 of this CCP/environmental impact statement [EIS]) in an adaptive management context to achieve refuge resource objectives. To satisfy requirements for IPM planning as identified in the Director's Memo (dated September 9, 2004) entitled *Integrated Pest Management Plans and Pesticide Use Proposals: Updates, Guidance, and an Online Database*, the following elements of an IPM program have been incorporated into this CCP:

- Habitat and/or wildlife objectives that identify pest species and appropriate thresholds to indicate the need for and successful implementation of IPM techniques; and
- Monitoring before and/or after treatment to assess progress toward achieving objectives including pest thresholds.

Where pesticides would be necessary to address pests, this appendix provides a structured procedure to evaluate potential effects of proposed uses involving ground-based applications to refuge biological resources and environmental quality in accordance with effects analyses presented in Chapter 6 of this CCP/EIS, *Environmental Consequences*. Only pesticide uses that likely would cause minor, temporary, or localized effects to refuge biological resources and environmental quality with appropriate best management practices (BMPs), where necessary, would be allowed for use on the refuge.

This appendix does not describe the more detailed process used to evaluate potential effects associated with aerial applications of pesticides. Moreover, it does not address effects of mosquito control with pesticides (larvicides, pupacides, or adulticides) based upon identified human health threats and presence of disease-carrying mosquitoes in sufficient numbers from monitoring conducted on a refuge. However, the basic framework to assess potential effects to refuge biological resources and environmental quality from aerial application of pesticides or use of insecticides for mosquito management would be similar to the process described in this appendix for ground-based treatments of other pesticides.

G.2 Pest Management Laws and Policies

In accordance with Service policy 569 FW 1 (Integrated Pest Management), plant, invertebrate, and vertebrate pests on units of the National Wildlife Refuge System (NWRS) can be controlled to ensure balanced wildlife and fish populations in support of refuge-specific wildlife and habitat management objectives. Pest control on federal (refuge) lands and waters also is authorized under the following legal mandates:

- National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee);
- Plant Protection Act of 2000 (7 U.S.C. 7701 et seq.);
- Noxious Weed Control and Eradication Act of 2004 (7 U.S.C. 7781-7786, Subtitle E);
- Federal Insecticide, Fungicide, and Rodenticide Act of 1996 (7 U.S.C. 136-136y);
- National Invasive Species Act of 1996 (16 U.S.C. 4701);
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701);
- Food Quality Protection Act of 1996 (7 U.S.C. 136);
- Executive Order 13148, Section 601(a);
- Executive Order 13112; and
- Animal Damage Control Act of 1931 (7 U.S.C. 426-426c, 46 Stat. 1468).

Pests are defined as "…living organisms that may interfere with the site-specific purposes, operations, or management objectives or that jeopardize human health or safety" according to Department policy 517 DM 1 (Integrated Pest Management Policy). Similarly, 569 FW 1 defines pests as "…invasive plants and introduced or native organisms that may interfere with achieving our management goals and objectives on or off our lands, or that jeopardize human health or safety." 517 DM 1 also defines an invasive species as "a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health." Throughout the remainder of this CCP/EIS, the terms "pest" and "invasive species" are used interchangeably because both can prevent/impede achievement of refuge wildlife and habitat objectives and/or degrade environmental quality.

In general, control of pests (vertebrate or invertebrate) on refuges would conserve and protect the nation's fish, wildlife, and plant resources as well as maintain environmental quality. From 569 FW 1, animal or plant species that are considered pests may be managed if the following criteria are met:

- Threat to human health and wellbeing or private property; the acceptable level of damage by the pest has been exceeded; or State or local government has designated the pest as noxious;
- Detrimental to resource objectives as specified in a refuge resource management plan (e.g., CCP, habitat management plan [HMP]), if available; and
- Control would not conflict with attainment of resource objectives or the purposes for which the refuge was established.

The specific justifications for pest management activities on refuges are the following:

- Protect human health and wellbeing;
- Prevent substantial damage to important refuge resources;
- Protect newly introduced species or re-establish native species;

- Control nonnative (exotic) species in order to support existence for populations of native species;
- Prevent damage to private property; and
- Provide the public with quality, compatible wildlife-dependent recreational opportunities.

In accordance with Service policy 620 FW 1 (Habitat Management Plans), there are additional management directives regarding invasive species found on the refuge:

- "We are prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere."
- "Manage invasive species to improve or stabilize biotic communities to minimize unacceptable change to ecosystem structure and function and prevent new and expanded infestations of invasive species. Conduct refuge habitat management activities to prevent, control, or eradicate invasive species…"

Animal species damaging/destroying federal property and/or detrimental to the management program of a refuge may be controlled as described in 50 C.F.R. 31.14 (Official Animal Control Operations). For example, the incidental removal of beavers damaging refuge infrastructure (e.g., clogging with subsequent damaging of water control structures) and/or negatively affecting habitats (e.g., removing woody species from existing or restored riparian areas) managed on refuge lands may be conducted without a pest control proposal. We recognize beavers are native species and most of their activities on refuge lands represent a natural process beneficial for maintaining wetland habitats.

Trespass and feral animals also may be controlled on refuge lands. Based upon 50 C.F.R. 28.43 (Destruction of Dogs and Cats), dogs and cats running at large on a national wildlife refuge and observed in the act of killing, injuring, harassing, or molesting humans or wildlife may be disposed of in the interest of public safety and protection of the wildlife. Feral animals should be disposed of by the most humane method(s) available and in accordance with relevant Service directives (including Executive Order 11643).

Disposed wildlife specimens may be donated or loaned to public institutions. Donation or loans of resident wildlife species would only be made after securing state approval (50 C.F.R. 30.11 [Donation and Loan of Wildlife Specimens]). Surplus wildlife specimens may be sold alive or butchered, dressed and processed subject to Federal and state laws and regulations (50 C.F.R. 30.12 [Sale of Wildlife Specimens]).

G.3 Strategies

To fully embrace IPM as identified in 569 FW 1, the following strategies, where applicable, would be carefully considered on the refuge for each pest species:

Prevention. This would be the most effective and least expensive long-term management option for pests. It encompasses methods to prevent new introductions or the spread of established pests to un-infested areas. It requires identifying potential routes of invasion to reduce the likelihood of infestation. Hazard Analysis and Critical Control Points (HACCP) planning can be used to determine if current management activities on a refuge may introduce and/or spread invasive species in order to

identify appropriate BMPs for prevention. See http://www.haccp-nrm.org/ for more information about HACCP planning.

Prevention may include source reduction, using pathogen-free or weed-free seeds or fill; exclusion methods (e.g., barriers) and/or sanitation methods (e.g., wash stations) to prevent re-introductions by various mechanisms including vehicles, personnel, livestock, and horses. Because invasive species are frequently the first to establish in newly disturbed sites, prevention would require a reporting mechanism for early detection of new pest occurrences with quick response to eliminate any new satellite pest populations. Prevention would require consideration of the scale and scope of land management activities that may promote pest establishment within un-infested areas or promote reproduction and spread of existing populations. Along with preventing initial introduction, prevention would involve halting the spread of existing infestations to new sites (Mullin et al. 2000). The primary reason for prevention would be to keep pest-free lands or waters from becoming infested. Executive Order 11312 emphasizes the priority of prevention with respect to managing pests.

The following are methods to prevent the introduction and/or spread of pests on refuge lands:

- Before beginning ground-disturbing activities (e.g., disking, scraping), inventory and prioritize pest infestations in project operating areas and along access routes. Refuge staff would identify pest species on-site or within reasonably expected potential invasion vicinity. Where possible, the refuge staff would begin project activities in un-infested areas before working in pest-infested areas.
- The refuge staff would locate and use pest-free project staging areas. They would avoid or minimize travel through pest-infested areas, or restrict use to those periods when spread of seed or propagules of invasive plants would be least likely.
- The refuge staff would determine the need for and, when appropriate, identify sanitation sites where equipment can be cleaned of pests. Where possible, the refuge staff would clean equipment before entering lands at on-refuge approved cleaning site(s). This practice does not pertain to vehicles traveling frequently in and out of the project area that remain on roadways. Seeds and plant parts of pest plants would need to be collected, where practical. The refuge staff would remove mud, dirt, and plant parts from project equipment before moving it into a project area.
- The refuge staff would clean all equipment before leaving the project site, if operating in areas infested with pests. The refuge staff would determine the need for and, when appropriate, identify sanitation sites where equipment can be cleaned.
- Refuge staff, their authorized agents, and refuge volunteers would, where possible, inspect, remove, and properly dispose of seed and parts of invasive plants found on their clothing and equipment. Proper disposal means bagging the seeds and plant parts and then properly discarding them (e.g., incinerating).
- The refuge staff would evaluate options, including closure, to restrict traffic at sites with ongoing restoration of desired vegetation. They would revegetate disturbed soil (except travel ways on surfaced projects) to optimize plant establishment for each specific site. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching as necessary. The refuge staff would use native material, where appropriate and feasible. They would use certified weed-free or weed-seed-free hay or straw where certified materials are reasonably available.

- The refuge staff would provide information, training, and appropriate pest identification materials to permit holders and recreational visitors. The refuge staff would educate them about pest identification, biology, impacts, and effective prevention measures.
- The refuge staff would require grazing permittees to use preventative measures for their livestock while on refuge lands.
- The refuge staff would inspect borrow material for invasive plants prior to use and transport onto and/or within refuge lands.
- The refuge staff would consider invasive plants in planning for road maintenance activities.
- The refuge staff would restrict off-road travel to designated routes.

The following are methods to prevent the introduction and/or spread of pests into refuge waters:

- The refuge staff would inspect boats (including air boats), trailers, and other boating equipment. Where possible, they would remove any visible plants, animals, or mud before leaving any waters or boat launching facilities. Where possible, the refuge staff would drain water from motor, live well, bilge, and transom wells while on land before leaving the site. If possible, the refuge staff would wash and dry boats, downriggers, anchors, nets, floors of boats, propellers, axles, trailers, and other boating equipment to kill pests not visible at the boat launch.
- Where feasible, the refuge staff would maintain a 100-foot buffer of aquatic pest-free clearance around boat launches and docks or quarantine areas when cleaning around culverts, canals, or irrigation sites. Where possible, the refuge staff would inspect and clean equipment before moving to new sites or one project area to another.

These prevention methods to minimize/eliminate the introduction and/or spread of pests were taken verbatim or slightly modified from the *Pacific Northwest Region Invasive Plant Program: Preventing and Managing Invasive Plants, Final Environmental Impact Statement* (U.S. Forest Service [USFS] 2005: Appendix E).

- **Mechanical/Physical Methods.** These methods would remove and destroy, disrupt the growth of, or interfere with the reproduction of pest species. For plants, these treatments can be accomplished by hand, hand tool (manual), or power tools (mechanical) and include pulling, grubbing, digging, tilling/disking, cutting, swathing, grinding, sheering, girdling, mowing, and mulching of the pest plants.

  For animal species, Service employees or their authorized agents could use mechanical/physical methods (including trapping) to control pests as a refuge management activity. Based upon 50 C.F.R. 31.2, trapping can be used on a refuge to reduce surplus wildlife populations for a “balanced conservation program” in accordance with Federal or state laws and regulations. In some cases, non-lethally trapped animals would be relocated to off-refuge sites with prior approval from the state.

  Each of these tools would be efficacious to some degree and applicable to specific situations. In general, mechanical controls can effectively control annual and biennial pest plants. However, to control perennial plants, the root system has to be destroyed or it would resprout and continue to grow and develop. Mechanical controls are typically not capable of destroying a perennial plant’s root system. Although some mechanical tools (e.g., disking, plowing) may damage root systems, they may stimulate regrowth, producing a denser plant population that may aid in the spread depending

upon the target species (e.g., Canada thistle). In addition, steep terrain and soil conditions would be major factors that can limit the use of many mechanical control methods.

Some mechanical control methods (e.g., mowing), which would be used in combination with herbicides, can be very effective techniques to control perennial species. For example, mowing perennial plants followed sequentially by treating the plant regrowth with a systemic herbicide often would improve the efficacy of the herbicide compared to herbicide treatment only.

- **Cultural Methods.** These methods would involve manipulating habitat to increase pest mortality by reducing its suitability to the pest. Cultural methods include water-level manipulation, mulching, planting winter cover crops, changing planting dates to minimize pest impact, using prescribed burning (facilitate revegetation, increase herbicide efficacy, and remove litter to assist in emergence of desirable species), flaming with propane torches, using trap crops, having crop rotations that include non-susceptible crops, moisture management, addition of beneficial insect habitat, reducing clutter, proper trash disposal, planting or seeding desirable species to shade or outcompete invasive plants, applying fertilizer to enhance desirable vegetation, prescriptive grazing, and other habitat alterations.

- **Biological Control Agents.** Classical biological control would involve the deliberate introduction and management of natural enemies (parasites, predators, or pathogens) to reduce pest populations. Many of the most ecologically or economically damaging pest species in the United States originated in foreign countries. These newly introduced pests, which are free from natural enemies found in their country or region of origin, may have a competitive advantage over cultivated and native species. This competitive advantage often allows introduced species to flourish, and they may cause widespread economic damage to crops or out compete and displace native vegetation. Once the introduced pest species population reaches a certain level, traditional methods of pest management may be cost-prohibitive or impractical. Biological controls typically are used when these pest populations have become so widespread that eradication or effective control would be difficult or no longer practical.

  Biological control has advantages as well as disadvantages. Benefits include reducing pesticide use, host specificity for target pests, long-term self-perpetuating control, low cost per acre, capacity for searching and locating hosts, synchronizing biological control agents to hosts' life cycles, and the low likelihood that hosts would develop resistance to agents. Disadvantages include the following: limited availability of agents from their native lands, the dependence of control on target species density, slow rate at which control occurs, biotype matching, the difficulty and expense of conflicts over control of the target pest, and host specificity when host populations are low.

  A reduction in target species populations from biological controls is typically a slow process, and efficacy can be highly variable. It may not work well in a particular area while working well in other areas. Biological control agents require specific environmental conditions to survive over time. Some of these conditions are understood, whereas others are only partially understood or not at all.

  Biological control agents would not eradicate a target pest. When using biological control agents, residual levels of the target pest typically are expected; the agent population level or survival would be dependent upon the density of its host. After the pest population decreases, the population of the biological control agent would decrease correspondingly. This is a natural cycle. Some pest populations (e.g., invasive plants) tend to persist for several years after a biological control agent

becomes established due to seed reserves in the soil, inefficiencies in the agents' search behavior, and the natural lag in population buildup of the agent.

The full range of pest groups potentially found on refuge lands and waters would include disease causing organisms, invertebrates (insects, mollusks), vertebrates, and invasive plants (the most common group). Often it is assumed that biological control would address many if not most of these pest problems. There are several well-documented success stories of biological control of invasive weed species in the Pacific Northwest, including Mediterranean sage, St. Johnswort (Klamath weed), and tansy ragwort. Emerging success stories include Dalmatian toadflax, diffuse knapweed, leafy spurge, purple loosestrife, and yellow star-thistle. However, historically, each new introduction of a biological control agent in the United States has only about a 30% success rate (Coombs et al. 2004). Refer to Coombs et al. (2004) for the status of biological control agents for invasive plants in the Pacific Northwest.

Introduced species without desirable close relatives in the United States would generally be selected as biological controls. Natural enemies that are restricted to one or a few closely related plants in their country of origin are targeted as biological controls (Center et al. 1997; Hasan and Ayres 1990).

The refuge staff would ensure introduced agents are approved by the applicable authorities. Except for a small number of formulated biological control products registered by the U.S. Environmental Protection Agency (USEPA) under Federal Insecticide, Fungicide and Rodenticide Act of 1972 (FIFRA), most biological control agents are regulated by the U.S. Department of Agriculture's (USDA's) Animal Plant Health Inspection Service, Plant Protection and Quarantine (APHIS-PPQ). State departments of agriculture and, in some cases, county agricultural commissioners or weed districts, have additional approval authority.

Federal permits (USDA-APHIS-PPQ Form 526) are required to import biocontrols agents from another state. Form 526 may be obtained by writing:

USDA-APHIS-PPQ
Biological Assessment and Taxonomic Support
4700 River Road, Unit 113
Riverdale, MD 20737

Or

Through the internet at: http://www.aphis.usda.gov/permits/ppq_epermits.shtml.

The Service strongly supports the development, and legal and responsible use of appropriate, safe, and effective biological control agents for nuisance and non-indigenous or pest species.

State and county agriculture departments may also be sources for biological control agents or they may have information about where biological control agents may be obtained. Commercial sources should have the Application and Permit to Move Live Plant Pests and Noxious Weeds (USDA-PPQ Form 226 USDA-APHIS-PPQ, Biological Assessment and Taxonomic Support, 4700 River Road, Unit 113, Riverdale, MD 20737) to release specific biological control agents in a state and/or county. Furthermore, certification regarding the biological control agent's identity (genus, specific epithet, subspecies, and variety) and purity (e.g., parasite free, pathogen free, and biotic and abiotic contaminants) should be specified in purchase orders.

Biological control agents are subject to 7 RM 8 (Exotic Species Introduction and Management). In addition, the refuge staff would follow the International Code of Best Practice for Classical Biological Control of Weeds (http://sric.ucdavis.edu/exotic/exotic.htm) as ratified by delegates to the X International Symposium on Biological Control of Weeds, Bozeman, Montana, on July 9, 1999. This code identifies the following:

- Release only approved biological control agents,
- Use the most effective agents,
- Document releases, and
- Monitor for impact to the target pest, non-target species, and the environment.

Biological control agents formulated as pesticide products and registered by the USEPA (e.g., *Bti*) are also subject to pesticide use proposals (PUP) review and approval (see below).

A record of all releases would be maintained with date(s), location(s), and environmental conditions of the release site(s); the identity, quantity, and condition of the biological control agents released; and other relevant data and comments such as weather conditions. Systematic monitoring to determine the establishment and effectiveness of the release is also recommended.

National Environmental Policy Act (NEPA) documents regarding biological and other environmental effects of biological control agents prepared by another Federal agency, where the scope is relevant to evaluation of releases on refuge lands, would be reviewed. Possible source agencies for such NEPA documents include the Bureau of Land Management (BLM), the USFS, the National Park Service, USDA Animal and Plant Health Inspection Service, and the military services. It might be appropriate to incorporate by reference parts or all of existing document(s) from the review. Incorporating by reference (43 C.F.R. 46.135) is a technique used to avoid redundancies in analysis. It also can reduce the bulk of a Service NEPA document, which must only identify the documents that are incorporated by reference. In addition, relevant portions must be summarized in the Service NEPA document to the extent necessary to provide the decision maker and public with an understanding of the relevance of the referenced material to the current analysis.

- **Pesticides.** The selective use of pesticides would be based upon pest ecology (including mode of reproduction), the size and distribution of pest populations, site-specific conditions (e.g., soils, topography), known efficacy under similar site conditions, and the capability to use BMPs to reduce/eliminate potential effects to non-target species and sensitive habitats, and the potential to contaminate surface and groundwater. All pesticide use (pesticide, target species, application rate, and method of application) would comply with the applicable Federal (FIFRA) and state regulations pertaining to pesticide use, safety, storage, disposal, and reporting. Before pesticides can be used to eradicate, control, or contain pests on refuge lands and waters, PUPs would be prepared and approved in accordance with 569 FW 1. PUP records would provide a detailed, time-, site-, and target-specific description of the proposed use of pesticides on the refuge. All PUPs would be created, approved, or disapproved, and stored in the Pesticide Use Proposal System (PUPS), which is a centralized database only accessible on the Service's intranet (https://systems.fws.gov/pups). Only Service employees would be authorized to access PUP records for a refuge in this database.

  Application equipment would be selected to provide site-specific delivery to target pests while minimizing/eliminating direct or indirect (e.g., drift) exposure to non-target areas and degradation of surface and groundwater quality. Where possible, target-specific equipment (e.g., backpack sprayer, wiper) would be used to treat target pests. Other target-specific equipment to apply pesticides would

include soaked wicks or paint brushes for wiping vegetation and lances, hatchets, or syringes for direct injection into stems. Granular pesticides may be applied using seeders or other specialized dispensers. In contrast, aerial spraying (e.g., fixed wing or helicopter) would only be used where access is difficult (remoteness) and/or the size/distribution of infestations precludes practical use of ground-based methods.

Because repeated use of one pesticide may allow resistant organisms to survive and reproduce, multiple pesticides with variable modes of action would be considered for treatments on refuge lands and waters. This is especially important if multiple applications within years and/or over a growing season likely would be necessary for habitat maintenance and restoration activities to achieve resource objectives. Integrated chemical and non-chemical controls also are highly effective, where practical, because pesticide-resistant organisms can be removed from the site.

Cost may not be the primary factor in selecting a pesticide for use on a refuge. If the least expensive pesticide would potentially harm natural resources or people, then a different product would be selected, if available. The most efficacious pesticide available with the least potential to degrade environmental quality (soils, surface water, and groundwater) and the least potential effect on native species and communities of fish, wildlife, plants, and their habitats would be acceptable for use on refuge lands in the context of an IPM approach.

- **Habitat restoration/maintenance.** Restoration and/or proper maintenance of refuge habitats associated with achieving wildlife and habitat objectives would be essential for long-term prevention, eradication, or control (at or below threshold levels) of pests. Promoting desirable plant communities through the manipulation of species composition, plant density, and growth rate is an essential component of invasive plant management (Brooks et al. 2004; Masters and Shelly 2001; Masters et al. 1996). The following three components of succession could be manipulated through habitat maintenance and restoration: site availability, species availability, and species performance (Cox and Anderson 2004). Although a single method (e.g., herbicide treatment) may eliminate or suppress pest species in the short term, the resulting gaps and bare soil create niches that are conducive to further invasion by the species and/or other invasive plants. On degraded sites where desirable species are absent or in low abundance, revegetation with native/desirable grasses, forbs, and legumes may be necessary to direct and accelerate plant community recovery and achieve site-specific objectives in a reasonable timeframe. The selection of appropriate species for revegetation would be dependent on a number of factors including resource objectives and site-specific, abiotic factors (e.g., soil texture, precipitation/temperature regimes, and shade conditions). Seed availability and cost, ease of establishment, seed production, and competitive ability also would be important considerations.

G.4 Priorities for Treatments

For many refuges, the magnitude (number, distribution, and sizes of infestations) of pest problems is too extensive and beyond the available capital resources to effectively address during any single field season. To manage pests in such a refuge, it would be essential to prioritize treatment of infestations. Highest priority treatments would be focused on early detection and rapid response to eliminate infestations of new pests, if possible. This would be especially important for aggressive pests potentially impacting species, species groups, communities, and/or habitats associated refuge purpose(s), NWRS resources of concern (federally listed species, migratory birds, selected marine mammals, and interjurisdictional fish), and native species for maintaining/restoring biological integrity, diversity, and environmental health.

The next priority would be treating established pests that appear in one or more previously un-infested areas. Moody and Mack (1988) demonstrated through modeling that small, new outbreaks of invasive plants eventually would infest an area larger than the established, source population. They also found that control efforts focusing on the large, main infestation rather than the new, small satellites reduced the chances of overall success. The lowest priority would be treating large infestations (sometimes monotypic stands) of well-established pests. In this case, initial efforts would focus upon containment of the perimeter followed by work to control/eradicate the established infested area. If containment and/or control of a large infestation are not effective, then efforts would focus upon halting pest reproduction or managing source populations. Maxwell et al. (2009) found treating fewer populations that are sources represents an effective long-term strategy to reduce the total number of invasive populations and decrease meta-population growth rates.

Although state-listed noxious weeds would always be of high priority for management, other pest species known to cause substantial ecological impact would also be considered. For example, cheatgrass may not be listed by a state as noxious, but it can greatly alter fire regimes in shrub-steppe habitats, resulting in large monotypic stands that displace native bunch grasses, forbs, and shrubs. Pest control would likely require a multi-year commitment from refuge staff. Essential to the long-term success of pest management would be pre- and post-treatment monitoring, assessment of the successes and failures of treatments and development of new approaches when proposed methods do not achieve desired outcomes.

G.5 Best Management Practices

BMPs can minimize or eliminate possible effects associated with pesticide usage to non-target species and/or sensitive habitats as well as degradation of water quality from drift, surface runoff, or leaching. Based upon the Department of Interior Pesticide Use policy (517 DM 1) and the Service Integrated Pest Management policy (569 FW 1), the use of applicable BMPs (where feasible) also would likely ensure that pesticide uses may not adversely affect federally listed species and/or their critical habitats through determinations made using the process described in 50 C.F.R. 402.

The following are BMPs pertaining to mixing/handling and applying pesticides for all ground-based treatments of pesticides, which would be considered and used, where feasible, based upon target- and site-specific factors and time-specific environmental conditions. Although not listed below, the most important BMP to eliminate/reduce potential impacts to non-target resources would be an IPM approach to preventing, controlling, eradicating, and containing pests.

G.5.1 Pesticide Handling and Mixing

- As a precaution against spilling, spray tanks would not be left unattended during filling.
- All pesticide containers would be triple rinsed, and the rinsate would be used as water in the sprayer tank and applied to treatment areas.
- All pesticide spray equipment would be properly cleaned. Where possible, rinsate would be used as part of the make-up water in the sprayer tank and applied to treatment areas.
- The refuge staff would triple rinse and recycle (where feasible) pesticide containers.
- All unused pesticides would be properly discarded at a local “safe send” collection.
- Pesticides and pesticide containers would be lawfully stored, handled, and disposed of in accordance with the label and in a manner safeguarding human health, fish, and wildlife, and preventing soil and water contamination.

- The refuge staff would consider the water quality parameters (e.g., pH, hardness) that are important to ensure greatest efficacy where specified on the pesticide label.
- All pesticide spills would be addressed immediately using procedures identified in the refuge spill response plan.

G.5.2 Applying Pesticides

- Pesticide treatments would only be conducted by or under the supervision of Service personnel and non-Service applicators with the appropriate state or BLM certification to safely and effectively conduct these activities on refuge lands and waters.
- The refuge staff would comply with all applicable Federal, state, and local pesticide use laws and regulations as well as Departmental, Service, and NWRS pesticide-related policies. For example, the refuge staff would use application equipment and apply rates for the specific pest(s) identified on the pesticide label as required under FIFRA.
- Before each treatment season and prior to mixing or applying any product for the first time each season, all applicators would review the labels, material safety data sheets (MSDSs), and PUPs for each pesticide, determining the target pest, appropriate mix rate(s), personal protective equipment (PPE), and other requirements listed on the pesticide label.
- A 1-foot no-spray buffer from the water's edge would be used, where applicable and where it does not detrimentally influence effective control of pest species.
- Low-impact herbicide application techniques (e.g., spot treatment, cut stump, oil basal, Thinvert system applications) would be used rather than broadcast foliar applications (e.g., boom sprayer, other larger tank wand applications), where practical.
- Low-volume rather than high-volume foliar applications would be used where low-impact methods mentioned above are not feasible or practical to maximize herbicide effectiveness and ensure correct and uniform application rates.
- Applicators would use and adjust spray equipment to apply the coarsest droplet size spectrum with optimal coverage of the target species while reducing drift.
- Applicators would use the largest droplet size that results in uniform coverage.
- Applicators would use drift-reduction technologies such as low-drift nozzles, where possible.
- Where possible, spraying would occur during low (average <7 miles per hour [mph] and preferably 3 to 5 mph) and consistent direction wind conditions with moderate temperatures (typically <85°F).
- Where possible, applicators would avoid spraying during inversion conditions (often associated with calm and very low wind conditions) that can cause large-scale herbicide drift to non-target areas.
- Equipment would be calibrated regularly to ensure that the proper rate of pesticide is applied to the target area or species.
- Spray applications would be made at the lowest height for uniform coverage of target pests to minimize/eliminate potential drift.
- If windy conditions frequently occur during afternoons, spraying (especially boom treatments) would typically be conducted during early morning hours.
- Spray applications would not be conducted on days with >30% forecast for rain within 6 hours, except for pesticides that are rapidly rain-fast (e.g., glyphosate in 1 hour) to minimize/eliminate potential runoff.
- Where possible, applicators would use drift retardant adjuvants during spray applications, especially adjacent to sensitive areas.

- Where possible, applicators would use a non-toxic dye to aid in identifying target area treated as well as potential overspray or drift. A dye can also aid in detecting equipment leaks. If a leak is discovered, the application would be stopped until repairs can be made to the sprayer.
- For pesticide uses associated with cropland and facilities management, buffers, as appropriate, would be used to protect sensitive habitats, especially wetlands and other aquatic habitats.
- When drift cannot be sufficiently reduced through altering equipment set up and application techniques, buffer zones may be identified to protect sensitive areas downwind of applications. The refuge staff would only apply adjacent to sensitive areas when the wind is blowing in the opposite direction.
- Applicators would use scouting for early detection of pests to eliminate unnecessary pesticide applications.
- The refuge staff would consider timing of applications so native plants are protected (e.g., senescence), while effectively treating invasive plants.
- Rinsate from cleaning spray equipment after application would be recaptured and reused or applied to an appropriate pest plant infestation.
- Application equipment (e.g., sprayer, all-terrain vehicle [ATV], tractor) would be thoroughly cleaned and PPE would be removed or disposed of on-site by applicators after treatments to eliminate the potential spread of pests to un-infested areas.

G.6 Safety

G.6.1 Personal Protective Equipment

All applicators would wear the specific PPE identified on the pesticide label. The appropriate PPE should be worn at all times during handling, mixing, and applying. PPE can include the following: disposable (e.g., Tyvek) or laundered coveralls; gloves (latex, rubber, or nitrile); rubber boots; and/or a National Institute for Occupational Safety and Health (NIOSH)–approved respirator. Because exposure to concentrated product is usually greatest during mixing, extra care should be taken while preparing pesticide solutions. Persons mixing these solutions can be best protected if they wear long gloves, an apron, footwear, and a face shield.

Coveralls and other protective clothing used during an application would be laundered separately from other laundry items. Transporting, storing, handling, mixing, and disposing of pesticide containers would be consistent with label requirements, USEPA and Occupational Safety and Health Administration (OSHA) requirements, and Service policy.

If a respirator is necessary for a pesticide use, then the following requirements would be met in accordance with Service safety policy: a written Respirator Program, fit testing, physical examination (including pulmonary function and blood work for contaminants), and proper storage of the respirator.

G.6.2 Notification

The restricted entry interval (REI) is the time period after the application after which someone may safely enter a treated area without PPE. Refuge staff, authorized management agents of the Service, volunteers, and members of the public who could be in or near a pesticide-treated area within the

stated re-entry time period on the label would be notified about treatment areas. Posting would occur at any site where individuals might inadvertently become exposed to a pesticide during other activities on the refuge. Where required by the label and/or state-specific regulations, sites would also have information posted on its perimeter and at other likely locations of entry. The refuge staff would also notify appropriate private property owners of an intended application, including any private individuals who have requested notification. Special efforts would be made to contact nearby individuals who are beekeepers or who have expressed chemical sensitivities.

G.6.3 Medical Surveillance

Medical surveillance may be required for Service personnel and approved volunteers who mix, apply, and/or monitor use of pesticides (see 242 FW 7 [Pesticide Users] and 242 FW 4 [Medical Surveillance]). In accordance with 242 FW 7.12A, Service personnel would be medically monitored if one or more of the following criteria are met: personnel are exposed or may have been exposed to concentrations at or above the published permissible exposure limits or threshold limit values (see 242 FW 4); the personnel use pesticides in a manner considered “frequent pesticide use”; or the personnel use pesticides in a manner that requires a respirator (see 242 FW 14 for respirator use requirements). In 242 FW7.7A, “Frequent Pesticide Use means when a person applying pesticide handles, mixes, or applies pesticides, with a Health Hazard rating of 3 or higher, for 8 or more hours in any week or 16 or more hours in any 30-day period.” Under some circumstances, individuals who use pesticides infrequently, experience an acute exposure (sudden, short term), or use pesticides with a health hazard ranking of 1 or 2 may be medically monitored. This decision would consider the individual’s health and fitness level, the pesticide’s specific health risks, and the potential risks from other pesticide-related activities. Refuge cooperators (e.g., cooperative farmers) and other authorized agents (e.g., state and county employees) would be responsible for their own medical monitoring needs and costs.

Standard examinations (at refuge expense) of appropriate refuge staff would be provided by the nearest certified occupational health and safety physician as determined by Federal Occupational Health.

G.6.4 Certification and Supervision of Pesticide Applicators

Appropriate Refuge staff or approved volunteers handling, mixing, and/or applying, or directly supervising others engaged in pesticide use activities would be trained and state or federally (BLM) licensed to apply pesticides to refuge lands or waters. In accordance with 242 FW7.18A and 569 FW 1.10B, certification is required to apply restricted use pesticides based upon USEPA regulations. For safety reasons, all individuals participating in pest management activities with general use pesticides are also encouraged to attend appropriate training or acquire pesticide applicator certification. The certification requirement would be for a commercial or private applicator depending upon the state. New staff unfamiliar with proper procedures for storing, mixing, handling, applying, and disposing of herbicides and containers would receive orientation and training before handling or using any products. Documentation of training would be kept in the files at the refuge office.

G.6.5 Record Keeping

G.6.5.1 Labels and material safety data sheets

Pesticide labels and MSDSs would be maintained at the refuge shop and laminated copies kept in the mixing area. These documents would also be carried by field applicators, where possible. A written reference (e.g., note pad, chalk board, dry erase board) for each tank to be mixed would be kept in the mixing area for quick reference while mixing is in progress. In addition, approved PUPs stored in the PUPS database typically contain website links (URLs) to pesticide labels and MSDSs.

G.6.5.2 Pesticide use proposals

A PUP would be prepared for each proposed pesticide use associated with annual pest management on refuge lands and waters. A PUP would include specific information about the proposed pesticide use including the common and chemical names of the pesticide(s), target pest species, size and location of treatment site(s), application rate(s) and method(s), and federally listed species determinations, where applicable.

In accordance with Service guidelines (Director's memo [December 12, 2007]), a refuge staff may receive up to five-year approvals for Washington Office and field-reviewed proposed pesticide uses based upon meeting identified criteria including an approved IPM plan, where necessary (see http://www.fws.gov/contaminants/Issues/IPM.cfm). For a refuge, an IPM plan (requirements described herein) can be completed independently or in association with a CCP or HMP if IPM strategies and potential environmental effects are adequately addressed within appropriate NEPA documentation.

PUPs would be created, approved, or disapproved, and stored as records in the PUPS, which is a centralized database on the Service's intranet (https://systems.fws.gov/pups). Only Service employees can access PUP records in this database.

G.6.5.3 Pesticide usage

In accordance with 569 FW 1, the refuge Project Leader would be required to maintain records of all pesticides annually applied on lands or waters under refuge jurisdiction. This would encompass pesticides applied by other federal agencies, state and county governments, non-government applicators including cooperators and their pest management service providers with Service permission. For clarification, pesticide means all insecticides, insect and plant growth regulators, dessicants, herbicides, fungicides, rodenticides, acaricides, nematicides, fumigants, avicides, and piscicides.

The following usage information can be reported for approved PUPs in the PUPS database:

- Pesticide trade name(s)
- Active ingredient(s)
- Total acres treated
- Total amount of pesticides used (lbs or gallons)
- Total amount of active ingredient(s) used (lbs)
- Target pest(s)
- Efficacy (% control)

To determine whether treatments are efficacious (eradicating, controlling, or containing the target pest) and achieving resource objectives, habitat and/or wildlife response would be monitored both pre- and post-treatment, where possible. Considering available annual funding and staffing, appropriate monitoring data regarding characteristics (attributes) of pest infestations (e.g., area, perimeter, degree of infestation density, percent cover, density) as well as habitat and/or wildlife response to treatments may be collected and stored in a relational database (e.g., Refuge Habitat Management Database), preferably a geo-referenced data management system (e.g., Refuge Lands Geographic Information System [RLGIS]) to facilitate data analyses and subsequent reporting. In accordance with adaptive management, data analysis and interpretation would allow treatments to be modified or changed over time, as necessary, to achieve resource objectives considering site-specific conditions in conjunction with habitat and/or wildlife responses. Monitoring could also identify short- and long-term impacts to natural resources and environmental quality associated with IPM treatments in accordance with adaptive management principles identified in 43 C.F.R. 46.145.

G.7 Evaluating Pesticide Use Proposals

Pesticides would only be used on refuge lands for habitat management and croplands/facilities maintenance after approval of a PUP. In general, proposed pesticide uses on refuge lands would only be approved where there would likely be minor, temporary, or localized effects to fish and wildlife species and minimal potential to degrade environmental quality. Potential effects to listed and non-listed species would be evaluated with quantitative ecological risk assessments and other screening measures. Potential effects to environmental quality would be based upon pesticide characteristics of environmental fate (water solubility, soil mobility, soil persistence, and volatilization) and other quantitative screening tools. Ecological risk assessments, characteristics of environmental fate, and potential to degrade environmental quality for pesticides would be documented in Chemical Profiles (see Section G.7.6). These profiles would include threshold values for quantitative measures of ecological risk assessments and screening tools for environmental fate that represent minimal potential effects to species and environmental quality. In general, only pesticide uses with appropriate BMPs (see Section G.5) for habitat management and cropland/facilities maintenance on refuge lands that would potentially have minor, temporary, or localized effects on refuge biological and environmental quality (threshold values not exceeded) would be approved.

G.7.1 Overview of Ecological Risk Assessment

An ecological risk assessment process would be used to evaluate potential adverse effects to biological resources as a result of a pesticide(s) proposed for use on refuge lands. It is an established quantitative and qualitative methodology for comparing and prioritizing risks of pesticides and conveying an estimate of the potential risk for an adverse effect. This quantitative methodology provides an efficient mechanism to integrate best available scientific information regarding hazard, patterns of use (exposure), and dose-response relationships in a manner that is useful for ecological risk decision-making. It would provide an effective way to evaluate potential effects where there is missing or unavailable scientific information (data gaps) to address reasonable, foreseeable adverse effects in the field as required under 40 C.F.R. 1502.22. Protocols for ecological risk assessment of pesticide uses on the refuge were developed through research and established by the USEPA (2004). Assumptions for these risk assessments are presented in Section G.7.2.3.

The toxicological data used in ecological risk assessments are typically results of standardized laboratory studies provided by pesticide registrants to the USEPA to meet regulatory requirements

under FIFRA. These studies assess the acute (lethality) and chronic (reproductive) effects associated with short- and long-term exposure to pesticides on representative species of birds, mammals, freshwater fish, aquatic invertebrates, and terrestrial and aquatic plants. Other effects data publicly available would also be used for risk assessment protocols described herein. Toxicity endpoint and environmental fate data are available from a variety of resources. Some of the more useful resources can be found in Section G.7.6.

Table G-1. Ecotoxicity Tests Used to Evaluate Potential Effects to Birds, Fish, and Mammals to Establish Toxicity Endpoints for Risk Quotient Calculations

Species Group	Exposure	Measurement endpoint
Bird	Acute	Median Lethal Concentration (LC_{50})
	Chronic	No Observed Effect Concentration (NOEC) or No Observed Adverse Effect Concentration (NOAEC)[a]
Fish	Acute	Median Lethal Concentration (LC_{50})
	Chronic	No Observed Effect Concentration (NOEC) or No Observed Adverse Effect Concentration (NOAEC)[b]
Mammal	Acute	Oral Lethal Dose (LD_{50})
	Chronic	No Observed Effect Concentration (NOEC) or No Observed Adverse Effect Concentration (NOAEC)[c]

[a] Measurement endpoints typically include a variety of reproductive parameters (e.g., number of eggs, number of offspring, eggshell thickness, and number of cracked eggs).
[b] Measurement endpoints for early life stage/life cycle typically include embryo hatch rates, time to hatch, growth, and time to swim-up.
[c] Measurement endpoints include maternal toxicity, teratogenic effects or developmental anomalies, evidence of mutagenicity or genotoxicity, and interference with cellular mechanisms such as DNA synthesis and DNA repair.

G.7.2 Determining Ecological Risk to Fish and Wildlife

The potential for pesticides used on the refuge to cause direct adverse effects to fish and wildlife would be evaluated using USEPA's Ecological Risk Assessment Process (USEPA 2004). This deterministic approach, which is based upon a two-phase process involving estimation of environmental concentrations and then characterization of risk, would be used for ecological risk assessments. This method integrates exposure estimates (estimated environmental concentration [EEC] and toxicological endpoints [e.g., LC_{50} and oral LD_{50}]) to evaluate the potential for adverse effects to species groups (birds, mammals, and fish) representative of legal mandates for managing units of the NWRS. This integration is achieved through risk quotients (RQs) calculated by dividing the EEC by acute and chronic toxicity values selected from standardized toxicological endpoints or published effect (Table G-1).

$$RQ = EEC/Toxicological\ Endpoint$$

The level of risk associated with direct effects of pesticide use would be characterized by comparing calculated RQs to the appropriate Level of Concern (LOC) established by the USEPA (1998 [Table 2]). The LOC represents a quantitative threshold value for screening potential adverse effects to fish and wildlife resources associated with pesticide use. The following are four exposure-species group scenarios that would be used to characterize ecological risk to fish and wildlife on the refuge: acute-listed species, acute-nonlisted species, chronic-listed species, and chronic-nonlisted species.

Acute risk would indicate the potential for mortality associated with short-term dietary exposure to pesticides immediately after an application. For characterization of acute risks, median values from LC_{50} and LD_{50} tests would be used as toxicological endpoints for RQ calculations. In contrast,

chronic risks would indicate the potential for adverse effects associated with long-term dietary exposure to pesticides from a single application or multiple applications over time (within a season and over years). For characterization of chronic risks, the no observed adverse effect concentration (NOAEC) or no observed effect concentration (NOEC) for reproduction would be used as toxicological endpoints for RQ calculations. Where available, the NOAEC would be preferred over a NOEC value.

Listed species are those federally designated as threatened, endangered, or proposed in accordance with the Endangered Species Act of 1973 (16 U.S. Code [U.S.C.] 1531-1544, 87 Stat. 884, as amended, Public Law 93-205). For listed species, potential adverse effects would be assessed at the individual level because loss of individuals from a population could detrimentally impact a species. In contrast, risks to non-listed species would consider effects at the population level. An RQ<LOC would indicate the proposed pesticide use "may affect, not likely to adversely affect" individuals (listed species), and it would not pose an unacceptable risk for adverse effects to populations (non-listed species) for each taxonomic group (Table G-2). In contrast, an RQ>LOC would indicate a "may affect, likely to adversely affect" for listed species, and it would also pose unacceptable ecological risk for adverse effects to non-listed species.

Table G-2. Presumption of Unacceptable Risk for Birds, Fish, and Mammals

Risk Presumption		Level of Concern	
		Listed Species	Nonlisted Species
Acute	Birds	0.1	0.5
	Fish	0.05	0.5
	Mammals	0.1	0.5
Chronic	Birds	1.0	1.0
	Fish	1.0	1.0
	Mammals	1.0	1.0

Source: EPA (1998).

G.7.2.1 Environmental exposure

Following release into the environment through application, pesticides would experience several different routes of environmental fate. Pesticides that would be sprayed can move through the air (e.g., particle or vapor drift) and may eventually end up in other parts of the environment such as non-target vegetation, soil, or water. Pesticides may be bound to soil particles or organic matter and may be transformed by soil micro-organisms or chemical processes. Pesticides applied directly to the soil may be washed off the soil into nearby bodies of surface water (e.g., surface runoff) or may percolate through the soil to lower soil layers and groundwater (e.g., leaching) (Baker and Miller 1999; Butler et al. 1998; Extension Toxicology Network [EXTOXNET] 1993; Pope et al. 1999; Ramsay et al. 1995). Pesticides that would be injected into the soil may also be subject to the latter two fates.

The aforementioned possibilities are by no means complete, but they do indicate that movement of pesticides in the environment is very complex, with transfers occurring continually among different environmental compartments. In some cases, these exchanges occur not only between areas that are close together, but may also involve transportation of pesticides over long distances (Barry 2004; Woods 2004).

G.7.2.1.1 Terrestrial exposure

The EEC for exposure to terrestrial wildlife would be quantified using an USEPA screening-level approach (USEPA 2004). This screening-level approach is not affected by product formulation because it evaluates pesticide active ingredient(s). This approach would vary depending upon the proposed pesticide application method: spray or granular.

G.7.2.1.1.1 Terrestrial—spray application

For spray applications, exposure would be determined using the Kanaga nomogram method (Pfleeger et al. 1996; USEPA 2004, 2005a) through the USEPA's Terrestrial Residue Exposure model (T-REX) version 1.2.3 (USEPA 2005b). To estimate the maximum (initial) pesticide residue on short grass (<20 cm tall) as a general food item category for terrestrial vertebrate species, T-REX input variables would include the following from the pesticide label: maximum pesticide application rate (pounds active ingredient [a.i.] [acid equivalent]/acre) and pesticide half-life (days) in soil. Although there are other food item categories (tall grasses; broadleaf plants and small insects; and fruits, pods, seeds and large insects), short grass was selected because it would yield maximum EECs (240 parts per million [ppm] per lb a.i./acre) for worst-case risk assessments. Short grass is not representative of forage for carnivorous species (e.g., raptors), but it would characterize the maximum potential exposure through the diet of avian and mammalian prey items. Consequently, this approach would provide a conservative screening tool for pesticides that do not biomagnify.

For RQ calculations in T-REX, the model would require the weight of surrogate species and Mineau scaling factors (Mineau et al. 1996). Body weights of bobwhite quail and mallard are included in T-REX by default, but body weights of other organisms (Table G-3) would be entered manually. The Mineau scaling factor accounts for small-bodied bird species that may be more sensitive to pesticide exposure than would be predicted only by body weight. Mineau scaling factors would be entered manually with values ranging from 1 to 1.55 that are unique to a particular pesticide or group of pesticides. If specific information to select a scaling factor is not available, then a value of 1.15 would be used as a default. Alternatively, zero would be entered if it is known that body weight does not influence toxicity of pesticide(s) being assessed. The upper bound estimate output from the T-REX Kanaga nomogram would be used as an EEC for calculation of RQs. This approach would yield a conservative estimate of ecological risk.

Table G-3. Average Body Weight of Selected Terrestrial Wildlife Species Frequently Used in Research to Establish Toxicological Endpoints

Species	Body Weight (kg)
Mammal (15 g)	0.015
House sparrow	0.0277
Mammal (35 g)	0.035
Starling	0.0823
Red-winged blackbird	0.0526
Common grackle	0.114
Japanese quail	0.178
Bobwhite quail	0.178
Rat	0.200
Rock dove (aka pigeon)	0.542
Mammal (1,000 g)	1.000
Mallard	1.082
Ring-necked pheasant	1.135

Source: Dunning (1984).

G.7.2.1.1.2 Terrestrial—granular application

Granular pesticide formulations and pesticide-treated seed pose a unique route of exposure for avian and mammalian species. The pesticide is applied in discrete units that birds or mammals might ingest accidentally with food items, or intentionally as in the case of some bird species actively seeking and picking up gravel or grit to aid digestion or seed as a food source. Granules may also be consumed by wildlife foraging on earthworms, slugs, or other soft-bodied soil organisms to which the granules may adhere.

Terrestrial wildlife RQs for granular formulations or seed treatments would be calculated by dividing the maximum milligrams of a.i. exposed (e.g., EEC) on the surface of an area equal to 1 square foot by the appropriate LD_{50} value multiplied by the surrogate's body weight (Table G-3). An adjustment to surface area calculations would be made for broadcast, banded, and in-furrow applications. An adjustment also would be made for applications with and without incorporation of the granules. Without incorporation, it would be assumed that 100% of the granules remain on the soil surface, available to foraging birds and mammals. Press wheels push granules flat with the soil surface, but they are not incorporated into the soil. If granules are incorporated in the soil during band or T-band applications or after broadcast applications, it would be assumed only 15% of the applied granules remain available to wildlife. It would be assumed that only 1% of the granules are available on the soil surface following in-furrow applications.

EECs for pesticides applied in granular form and as seed treatments would be determined considering potential ingestion rates of avian or mammalian species (e.g., 10%-30% body weight/day). This would provide an estimate of maximum exposure that may occur as a result of granule or seed treatment spills such as those that commonly occur at end rows during application and planting. The availability of granules and seed treatments to terrestrial vertebrates would also be considered by calculating the loading per unit area (LD_{50}/foot^2) for comparison to USEPA LOCs (USEPA 1998). The T-REX version 1.2.3 (USEPA 2005b) contains a submodel that automates Kanaga exposure calculations for granular pesticides and treated seed.

The following formulas would be used to calculate EECs depending upon the type of granular pesticide application:

- In-furrow applications assume a typical value of 1% granules, bait, or seed remain unincorporated.

$$mg\ a.i./ft.^2 = [(lbs.\ product/acre)(\%\ a.i.)(453{,}580\ mg/lbs)(1\%\ exposed))] / \{[(43{,}560\ ft.^2/acre)/(row\ spacing\ (ft.))] / (row\ spacing\ (ft.)\}$$

or

$$mg\ a.i./ft^2 = [(lbs\ product/1{,}000\ ft.\ row)(\%\ a.i.)(1{,}000\ ft.\ row)(453{,}580\ mg/lb.)(1\%\ exposed)$$

$$EEC = [(mg\ a.i./ft.^2)(\%\ of\ pesticide\ biologically\ available)]$$

- Incorporated banded treatments assume that 15% of granules, bait, seeds are unincorporated.

$$mg\ a.i./ft.^2 = [(lbs.\ product/1{,}000\ row\ ft.)(\%\ a.i.)(453{,}580\ mg/lb.)(1\text{-}\%\ incorporated)] / (1{,}000\ ft.)(band\ width\ (ft.))$$

$$EEC = [(mg\ a.i./ft.^2)(\%\ of\ pesticide\ biologically\ available)]$$

- Broadcast treatment without incorporation assumes 100% of granules, bait, seeds are unincorporated.

$$mg\ a.i./ft.^2 = [(lbs.\ product/acre)(\%\ a.i.)(453{,}590\ mg/lb.)] / (43{,}560\ ft.^2/acre)$$

$$EEC = [(mg\ a.i./ft.^2)(\%\ of\ pesticide\ biologically\ available)]$$

Where:

  - % of pesticide biologically available = 100% without species -specific ingestion rates
  - Conversion for calculating mg a.i./ft.^{2} using ounces: 453,580 mg/lb. /16 = 28,349 mg/oz.

The following equation would be used to calculate an RQ based on the EEC calculated by one of the above equations. The EEC would be divided by the surrogate LD_{50} toxicological endpoint multiplied by the body weight (Table G-3) of the surrogate.

$$RQ = EEC / [LD_{50}\ (mg/kg) * body\ weight\ (kg)]$$

As with other risk assessments, an RQ>LOC would be a presumption of unacceptable ecological risk. An RQ<LOC would be a presumption of acceptable risk with only minor, temporary, or localized effects to species.

G.7.2.1.2 Aquatic exposure

Exposures to aquatic habitats (e.g., wetlands, meadows, ephemeral pools, water delivery ditches) would be evaluated separately for ground-based pesticide treatments of habitats managed for fish and wildlife compared with cropland/facilities maintenance. The primary exposure pathway for aquatic organisms from any ground-based treatments likely would be particle drift during the pesticide

application. However, different exposure scenarios would be necessary as a result of contrasting application equipment and techniques as well as pesticides used to control pests on agricultural lands (especially those cultivated by cooperative farmers for economic return from crop yields) and facilities maintenance (e.g., roadsides, parking lots, trails) compared with other managed habitats on the refuge. In addition, pesticide applications may be done <25 feet of the high-water mark of aquatic habitats for habitat management treatments, whereas no-spray buffers (≥25 feet) would be used for croplands/facilities maintenance treatments.

G.7.2.1.2.1 Habitat treatments

For the worst-case exposure scenario to non-target aquatic habitats, EECs (Table G-4) would be derived from Urban and Cook (1986). The EECs assume an intentional overspray to an entire, non-target water body (1-foot depth) from a treatment <25 feet from the high-water mark using the maximum application rate (acid basis [see above]). However, use of BMPs for applying pesticides (see Section G.5.2) would likely minimize/eliminate potential drift to non-target aquatic habitats during actual treatments. If there would be unacceptable (acute or chronic) risk to fish and wildlife with the simulated 100% overspray (RQ>LOC), then the proposed pesticide use may be disapproved or the PUP would be approved at a lower application rate to minimize/eliminate unacceptable risk to aquatic organisms (RQ = LOC).

Table G-4. EECs (ppb) of Pesticides in Aquatic Habitats (1-foot depth) Immediately after Direct Application

Lbs/acre	EEC (parts per billion [ppb])
0.10	36.7
0.20	73.5
0.25	91.9
0.30	110.2
0.40	147.0
0.50	183.7
0.75	275.6
1.00	367.5
1.25	459.7
1.50	551.6
1.75	643.5
2.00	735.7
2.25	827.6
2.50	919.4
3.00	1,103.5
4.00	1,471.4
5.00	1,839
6.00	2,207
7.00	2,575
8.00	2,943
9.00	3,311
10.00	3,678

Source: Urban and Cook (1986).

G.7.2.1.2.2 Cropland/facilities maintenance treatments

Field drift studies conducted by the Spray Drift Task Force, which is a joint project of several agricultural chemical businesses, were used to develop a generic spray drift database. From this database, the AgDRIFT computer model was created to satisfy USEPA pesticide registration spray drift data requirements and as a scientific basis to evaluate off-target movement of pesticides from particle drift and assess potential effects of exposure to wildlife. Several versions of the computer model have been developed (i.e., v2.01 through v2.10). The Spray Drift Task Force AgDRIFT model version 2.01 (AgDRIFT 2001; Spray Drift Task Force 2003) would be used to derive EECs resulting from drift of pesticides to refuge aquatic resources from ground-based pesticide applications >25 feet from the high-water mark. The Spray Drift Task Force AgDRIFT model is publicly available at http://www.agdrift.com. At this website, click "AgDRIFT 2.0," then click "Download Now," and follow the instructions to obtain the computer model.

The AgDRIFT model is composed of submodels called tiers. Tier I Ground submodel would be used to assess ground-based applications of pesticides. Tier outputs (EECs) would be calculated with AgDRIFT using the following input variables: maximum application rate (acid basis [see above]), low boom (20 inches), fine to medium droplet size, USEPA-defined wetland, and a ≥25-foot distance (buffer) from treated area to water.

G.7.2.2 Use of information on effects of biological control agents, pesticides, degradates, and adjuvants

NEPA documents regarding biological and other environmental effects of biological control agents, pesticides, degradates, and adjuvants prepared by another Federal agency, where the scope would be relevant to evaluation of effects from pesticide uses on refuge lands, would be reviewed. Possible source agencies for such NEPA documents include the BLM, USFS, the National Park Service, USDA Animal and Plant Health Inspection Service, and the military services. It might be appropriate to incorporate by reference parts or all of existing document(s). Incorporating by reference (40 C.F.R. 1502.21) is a technique used to avoid redundancies in analysis. It also would reduce the bulk of a Service NEPA document, which would only identify the documents that are incorporated by reference. In addition, relevant portions would be summarized in the Service NEPA document to the extent necessary to provide the decision maker and public with an understanding of relevance of the referenced material to the current analysis.

In accordance with the requirements set forth in 43 C.F.R. 46.135, the Service would specifically incorporate through reference ecological risk assessments prepared by the USFS (http://www.fs.fed.us/r6/invasiveplant-eis/Risk-Assessments/Herbicides-Analyzed-InvPlant-EIS.htm) and BLM (http://www.blm.gov/wo/st/en/prog/more/veg_eis.html). These risk assessments and associated documentation are also available in total with the administrative record for the Final EIS titled *Pacific Northwest Region Invasive Plant Program: Preventing and Managing Invasive Plants* (USFS 2005) and *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS (PEIS)* (BLM 2007). In accordance with 43 C.F.R. 46.120(d), use of existing NEPA documents by supplementing, tiering to, incorporating by reference, or adopting previous NEPA environmental analyses would avoid redundancy and unnecessary paperwork.

As a basis for completing "Chemical Profiles" for approving or disapproving refuge PUPs, ecological risk assessments for the following herbicide and adjuvant uses prepared by the USFS would be incorporated by reference:

- 2,4-D
- Chlorsulfuron
- Clopyralid
- Dicamba
- Glyphosate
- Imazapic
- Imazapyr
- Metsulfuron methyl
- Picloram
- Sethoxydim
- Sulfometuron methyl
- Triclopyr
- Nonylphenol polyethoxylate (NPE)–based surfactants

As a basis for completing "Chemical Profiles" for approving or disapproving refuge PUPs, ecological risk assessments for the following herbicide uses as well as evaluation of risks associated with pesticide degradates and adjuvants prepared by the BLM would be incorporated by reference:

- Bromacil
- Chlorsulfuron
- Diflufenzopyr
- Diquat
- Diuron
- Fluridone
- Imazapic
- Overdrive (diflufenzopyr and dicamba)
- Sulfometuron methyl
- Tebuthiuron
- Pesticide degradates and adjuvants (*Appendix D – Evaluation of risks from degradates, polyoxyethylene-amine (POEA) and R-11, and endocrine disrupting chemicals*)

G.7.2.3 Assumptions for ecological risk assessments

There are a number of assumptions involved with the ecological risk assessment process for terrestrial and aquatic organisms associated with using the USEPA's process. These assumptions may be risk neutral or may lead to an over- or under-estimation of risk from pesticide exposure depending upon site-specific conditions. These assumptions, their application to the conditions typically encountered, and whether they may lead to recommendations that are risk neutral, underestimate, or overestimate ecological risk from potential pesticide exposure are discussed below.

- Indirect effects would not be evaluated by ecological risk assessments. These effects include the mechanisms of indirect exposure to pesticides: consuming prey items (fish, birds, or

small mammals), reductions in the availability of prey items, and disturbance associated with pesticide application activities.

- Exposure to a pesticide product can be assessed based upon the active ingredient. However, exposure to a chemical mixture (pesticide formulation) may result in effects that are similar or substantially different compared to only the active ingredient. Non-target organisms may be exposed directly to the pesticide formulation or only various constituents of the formulation as they dissipate and partition in the environment. If toxicological information for both the active ingredient and formulated product are available, then data representing the greatest potential toxicity would be selected for use in the risk assessment process (USEPA 2004). As a result, this conservative approach may lead to an overestimation of risk characterization from pesticide exposure.
- Because toxicity tests with listed or candidate species or closely related species are not available, data for surrogate species would be most often used for risk assessments. Specifically, bobwhite quail and mallard duck are the most frequently used surrogates for evaluating potential toxicity to federally listed avian species. Bluegill sunfish, rainbow trout, and fathead minnow are the most common surrogates for evaluating toxicity for freshwater fishes. Sheepshead minnow can be an appropriate surrogate marine species for coastal environments. Rats and mice are the most common surrogates for evaluating toxicity for mammals. Interspecies sensitivity is a major source of uncertainty in pesticide assessments. As a result of this uncertainty, data are selected for the most sensitive species tested within a taxonomic group (birds, fish, and mammals), given the quality of the data is acceptable. If additional toxicity data for more species of organisms in a particular group are available, the selected data would not be limited to the species previously listed as common surrogates.
- The Kanaga nomogram outputs maximum EEC values that may be used to calculate an average daily concentration over a specified interval of time, which is referred to as a time-weighted-average (TWA). The maximum EEC would be selected as the exposure input for both acute and chronic risk assessments in the screening-level evaluations. The initial or maximum EEC derived from the Kanaga nomogram represents the maximum expected instantaneous or acute exposure to a pesticide. Acute toxicity endpoints are determined using a single exposure to a known pesticide concentration typically for 48 to 96 hours. This value is assumed to represent ecological risk from acute exposure to a pesticide. On the other hand, chronic risk to pesticide exposure is a function of pesticide concentration and duration of exposure to the pesticide. An organism's response to chronic pesticide exposure may result from either the concentration of the pesticide, length of exposure, or some combination of both factors. Standardized tests for chronic toxicity typically involve exposing an organism to several different pesticide concentrations for a specified length of time (days, weeks, months, years, or generations). For example, avian reproduction tests include a 10-week exposure phase. Because a single length of time is used in the test, time response data are usually not available for inclusion into risk assessments. Without time response data, it is difficult to determine the concentration that elicits a toxicological response.
- Using maximum EECs for chronic risk estimates may result in an overestimation of risk, particularly for compounds that dissipate rapidly. Conversely, using TWAs for chronic risk estimates may underestimate risk if it is the concentration rather than the duration of exposure that is primarily responsible for the observed adverse effect. The maximum EEC would be used for chronic risk assessments although it may result in an overestimation of risk. TWAs may be used for chronic risk assessments, but they would be applied judiciously considering the potential for an underestimation or overestimation of risk. For example, the number of days exposure exceeds an LOC may influence the suitability of a pesticide use.

The greater the number of days the EEC exceeds the LOC, the greater the ecological risk. This is a qualitative assessment, and is subject to the reviewer's expertise in ecological risk assessment and tolerance for risk.

- The length of time used to calculate the TWA can have a substantial effect on the exposure estimates, and there is no standard method for determining the appropriate duration for this estimate. The T-REX model assumes a 21-week exposure period, which is equivalent to avian reproductive studies designed to establish a steady-state concentration for bioaccumulative compounds. However, this does not necessarily define the true exposure duration needed to elicit a toxicological response. Pesticides that do not bioaccumulate may achieve a steady-state concentration earlier than 21 weeks. The duration of time used for calculating TWAs would require justification and would not exceed the duration of exposure in the chronic toxicity test (approximately 70 days for the standard avian reproduction study). An alternative to using the duration of the chronic toxicity study is to base the TWA on the application interval. In this case, increasing the application interval would suppress both the estimated peak pesticide concentration and the TWA. Another alternative to using TWAs would be to consider the number of days that a chemical is predicted to exceed the LOC.
- Pesticide dissipation is assumed to be first-order in the absence of data suggesting alternative dissipation patterns such as biphasic. Field dissipation data would generally be the most pertinent for assessing exposure in terrestrial species that forage on vegetation. However, these data are often not available and can be misleading, particularly if the compound is prone to "wash-off." Soil half-life is the most common degradation data available. Dissipation or degradation data that would reflect the environmental conditions typical of refuge lands would be used, if available.
- For species found in the water column, it would be assumed that the greatest bioavailable fraction of the pesticide active ingredient in surface waters is freely dissolved in the water column.
- Actual habitat requirements of any particular terrestrial species are not considered, and it is assumed that species exclusively and permanently occupy the treated area, or adjacent areas receiving pesticide at rates commensurate with the treatment rate. This assumption would produce a maximum estimate of exposure for risk characterization. This assumption would likely lead to an overestimation of exposure for species that do not permanently and exclusively occupy the treated area (USEPA 2004).
- Exposure through incidental ingestion of pesticide-contaminated soil is not considered in the USEPA risk assessment protocols. Research suggests <15% of the diet can consist of incidentally ingested soil depending upon species and feeding strategy (Beyer et al. 1994). An assessment of pesticide concentrations in soil compared to food item categories in the Kanaga nomogram indicates incidental soil ingestion would not likely increase dietary exposure to pesticides. Inclusion of soil into the diet would effectively reduce the overall dietary concentration compared to the present assumption that the entire diet consists of a contaminated food source (Fletcher et al. 1994). An exception to this may be soil-applied pesticides in which exposure from incidental ingestion of soil may increase. Potential for pesticide exposure under this assumption may be underestimated for soil-applied pesticides and overestimated for foliar-applied pesticides. The concentration of a pesticide in soil would likely be less than predicted in food items.
- Exposure through inhalation of pesticides is not considered in the USEPA risk assessment protocols. Such exposure may occur through three potential sources: spray material in droplet form at time of application, vapor phase with the pesticide volatilizing from treated surfaces, and airborne particulates (soil, vegetative matter, and pesticide dusts). The USEPA (1990)

reported that exposure from inhaling spray droplets at the time of application is not an appreciable route of exposure for birds. According to research on mallards and bobwhite quail, respirable particle size (particles reaching the lung) in birds is limited to a maximum diameter of 2 to 5 microns. The spray droplet spectra covering the majority of pesticide application scenarios indicate that less than 1% of the applied material is within the respirable particle size. This route of exposure is further limited because the permissible spray drop size distribution for ground pesticide applications is restricted to American Society of Agricultural Engineers (ASAE) medium or coarser drop size distribution.

- Inhalation of a pesticide in the vapor phase may be another source of exposure for some pesticides under certain conditions. This mechanism of exposure to pesticides occurs post-application and pertains to those pesticides that have a high vapor pressure. The USEPA is currently evaluating protocols for modeling inhalation exposure from pesticides including near-field and near-ground air concentrations based upon equilibrium and kinetics-based models. Risk characterization for exposure with this mechanism is unavailable.
- The effect from exposure to dusts contaminated with the pesticide cannot be assessed generically as partitioning issues related to application site soils and chemical properties of the applied pesticides render the exposure potential from this route highly situation-specific.
- Dermal exposure may occur through three potential sources: direct application of spray to terrestrial wildlife in the treated area or within the drift footprint, incidental contact with contaminated vegetation, or contact with contaminated water or soil. Interception of spray and incidental contact with treated substrates may pose a risk to avian wildlife (Driver et al. 1991). However, available research related to wildlife dermal contact with pesticides is extremely limited, with the exception of dermal toxicity values, which are common for some mammals used as human surrogates (rats and mice). The USEPA is currently evaluating protocols for modeling dermal exposure. Risk characterization may be underestimated for this route of exposure, particularly with high-risk pesticides such as some organophosphates or carbamate insecticides. If protocols are established by the USEPA for assessing dermal exposure to pesticides, they would be considered for incorporation into pesticide assessment protocols.
- Exposure to a pesticide may occur from consuming surface water, dew, or other water on treated surfaces. Water-soluble pesticides have the potential to dissolve in surface runoff, and puddles in a treated area may contain pesticide residues. Similarly, pesticides with lower organic carbon partitioning characteristics and higher solubility in water have a greater potential to dissolve in dew and other water associated with plant surfaces. Estimating the extent to which such pesticide loadings to drinking water occur is complex and would depend upon the partitioning characteristics of the active ingredient, soil types in the treatment area, and the meteorology of the treatment area. In addition, the use of various water sources by wildlife is highly species-specific. Currently, risk characterization for this exposure mechanism is not available. The USEPA is actively developing protocols to quantify drinking water exposures from puddles and dew. If and when protocols are formally established by the USEPA for assessing exposure to pesticides through drinking water, these protocols would be incorporated into pesticide risk assessment protocols.
- Risk assessments are based upon the assumption that the entire treatment area would be subject to pesticide application at the rates specified on the label. In most cases, there is potential for uneven application of pesticides due to incidents such as changes in calibration of application equipment, spillage, and localized releases at specific areas in or near the treated field that are associated with mixing, handling, and application equipment, as well as applicator skill. Inappropriate use of pesticides and the occurrence of spills represent a

potential underestimation of risk. However, they are likely not important factors for risk characterization. All pesticide applicators are required to be certified by the state in which they apply pesticides. Certification training includes the safe storage, transport, handling, and mixing of pesticides, equipment calibration, and proper application with annual continuing education.

- The USEPA relies on Fletcher (1994) for setting the assumed pesticide residues in wildlife dietary items. The USEPA (2004) "believes that these residue assumptions reflect a realistic upper-bound residue estimate, although the degree to which this assumption reflects a specific percentile estimate is difficult to quantify." Fletcher et al.'s (1994) research suggests that the pesticide active ingredient residue assumptions used by the USEPA represent a 95th percentile estimate. However, research conducted by Pfleeger et al. (1996) indicates that USEPA residue assumptions for short grass were not exceeded. Baehr and Habig (2000) compared USEPA residue assumptions with distributions of measured pesticide residues for the USEPA's UTAB (Uptake, Translocation, Accumulation, and Biotransformation) database. Overall residue selection level tends to overestimate risk characterization. This is particularly evident when wildlife individuals are likely to have selected a variety of food items acquired from multiple locations. Some food items may be contaminated with pesticide residues whereas others are not contaminated. However, it is important to recognize differences in species' feeding behavior. Some species may consume whole aboveground plant material, but others preferentially select different plant structures. Also, species may preferentially select a food item although multiple food items may be present. Without species-specific knowledge regarding foraging behavior, characterizing ecological risk other than in general terms is not possible.
- Acute and chronic risk assessments rely on comparisons of wildlife dietary residues with LC_{50} or NOEC values expressed as concentrations of pesticides in laboratory feed. These comparisons assume that ingestion of food items in the field occurs at rates commensurate with those in the laboratory. Although the screening assessment process adjusts dry-weight estimates of food intake to reflect the increased mass in fresh-weight wildlife food intake estimates, it does not allow for gross energy and assimilative efficiency differences between wildlife food items and laboratory feed. Differences in assimilative efficiency between laboratory and wild diets suggest that current screening assessment methods are not accounting for a potentially important aspect of food requirements.
- There are several other assumptions that can affect non-target species not considered in the risk assessment process. These include possible additive or synergistic effects from applying two or more pesticides or additives in a single application, co-location of pesticides in the environment, cumulative effects from pesticides with the same mode of action, effects of multiple stressors (e.g., combination of pesticide exposure, adverse abiotic and biotic factors), and behavioral changes induced by exposure to a pesticide. These factors may exist at some level contributing to adverse effects to non-target species, but they are usually characterized in the published literature in only a general manner, limiting their value in the risk assessment process.
- It is assumed that aquatic species exclusively and permanently occupy the water body being assessed. Actual habitat requirements of aquatic species are not considered. With the possible exception of scenarios where pesticides are directly applied to water, it is assumed that no habitat use considerations specific for any species would place the organisms in closer proximity to pesticide use sites. This assumption produces a maximum estimate of exposure or risk characterization. It would likely be realistic for many aquatic species that may be found in aquatic habitats within or in close proximity to treated terrestrial habitats. However,

the spatial distribution of wildlife is usually not random because wildlife distributions are often related to habitat requirements of species. Clumped distributions of wildlife may result in an underestimation or overestimation of risk depending upon where the initial pesticide concentration occurs relative to the species or species habitat.

- For species found in the water column, it would be assumed that the greatest bioavailable fraction of the pesticide active ingredient in surface waters is freely dissolved in the water column. Additional chemical exposure from materials associated with suspended solids or food items is not considered because partitioning onto sediments likely is minimal. Adsorption and bioconcentration occur at lower levels for many newer pesticides compared with older, more persistent bioaccumulative compounds. The potential for additional exposure from pesticides with RQs close to the listed species LOC, may be a limitation of risk assessments, where potential pesticide exposure or risk may be underestimated.
- Mass transport losses of pesticide from a water body (except for losses by volatilization, degradation, and sediment partitioning) would not be considered for ecological risk assessment. The water body would be assumed to capture all pesticide active ingredients entering as runoff, drift, and by being adsorbed to eroded soil particles. It would also be assumed that pesticide active ingredient is not lost from the water body by overtopping or flow-through, nor is concentration reduced by dilution. In total, these assumptions would lead to a near maximum possible water-borne concentration. However, this assumption would not account for the potential to concentrate pesticide through evaporative loss. This limitation may have the greatest impact on water bodies with high surface-to-volume ratios such as ephemeral wetlands, where evaporative losses are accentuated and applied pesticides have low rates of degradation and volatilization.
- For acute risk assessments, there would be no averaging time for exposure. An instantaneous peak concentration would be assumed, where instantaneous exposure is sufficient in duration to elicit acute effects comparable to those observed over more protracted exposure periods (typically 48 to 96 hours) tested in the laboratory. In the absence of data regarding time-to-toxic event, analyses, and latent responses to instantaneous exposure, risk would likely be overestimated.
- For chronic exposure risk assessments, the averaging times considered for exposure are commensurate with the duration of invertebrate life-cycle or fish early-life-stage tests (e.g., 21-28 days and 56-60 days, respectively). Response profiles (time to effect and latency of effect) to pesticides likely vary widely with mode of action and species, and should be evaluated on a case-by-case basis as available data allow. Nevertheless, because the USEPA relies on chronic exposure toxicity endpoints based on a finding of no observed effect, the potential for any latent toxicity effects or averaging time assumptions to alter the results of an acceptable chronic risk assessment prediction is limited. The extent to which duration of exposure from water-borne concentrations overestimate or underestimate actual exposure depends on several factors. These include the following: localized meteorological conditions, runoff characteristics of the watershed (e.g., soils, topography), the hydrological characteristics of receiving waters, environmental fate of the pesticide active ingredient, and the method of pesticide application. It should also be understood that chronic effects studies are performed using a method that holds water concentration in a steady state. This method is not likely to reflect conditions associated with pesticide runoff. Pesticide concentrations in the field increase and decrease in surface water on a cycle influenced by rainfall, pesticide use patterns, and degradation rates. As a result of the dependency of this assumption on several undefined variables, risk associated with chronic exposure may underestimate risk in some situations and overestimate risk in others.

- There are several other factors that can affect non-target species not considered in the risk assessment process. These include the following: possible additive or synergistic effects from applying two or more pesticides or additives in a single application, co-location of pesticides in the environment, cumulative effects from pesticides with the same mode of action, effects of multiple stressors (e.g., combination of pesticide exposure, adverse abiotic [not pesticides] and biotic factors), and sublethal effects such as behavioral changes induced by exposure to a pesticide. These factors may exist at some level, contributing to adverse effects to non-target species, but they are not routinely assessed by regulatory agencies. Therefore, information on these factors is not extensive, limiting their value for the risk assessment process. As this type of information becomes available, it would be included, either quantitatively or qualitatively, in this risk assessment process.
- USEPA is required by the Food Quality Protection Act to assess the cumulative risks of pesticides that share common mechanisms of toxicity, or act the same within an organism. Currently, USEPA has identified four groups of pesticides that have a common mechanism of toxicity requiring cumulative risk assessments. These four groups are: the organophosphate insecticides, N-methyl carbamate insecticides, triazine herbicides, and chloroacetanilide herbicides.

G.7.3 Pesticide Mixtures and Degradates

Pesticide products are usually a formulation of several components generally categorized as active ingredients and inert or other ingredients. The term “active ingredient” is defined by FIFRA as preventing, destroying, repelling, or mitigating the effects of a pest, or a plant regulator, defoliant, desiccant, or nitrogen stabilizer. In accordance with FIFRA, the active ingredient(s) must be identified by name(s) on the pesticide label along with its relative composition expressed in percentage(s) by weight. In contrast, inert ingredient(s) are not intended to affect a target pest. Their role in the pesticide formulation is to act as a solvent (keep the active ingredient in a liquid phase), an emulsifying or suspending agent (keep the active ingredient from separating out of solution), or a carrier (such as clay in which the active ingredient is impregnated on the clay particle in dry formulations). For example, if isopropyl alcohol is used as a solvent in a pesticide formulation, then it would be considered an inert ingredient. FIFRA only requires that inert ingredients identified as hazardous and their associated percent composition be declared on a product label, along with the total percentage of all inert ingredients. Inert ingredients that are not classified as hazardous are not required to be identified.

The USEPA (September 1997) issued Pesticide Regulation Notice 97-6, which encouraged manufacturers, formulators, producers, and registrants of pesticide products to voluntarily substitute the term “other ingredients” for “inert ingredients” in the ingredient statement. This change recognized that all components in a pesticide formulation could potentially elicit or contribute to an adverse effect on non-target organisms and, therefore, are not necessarily inert. Whether referred to as “inerts” or “other ingredients,” these constituents within a pesticide product have the potential to affect species or environmental quality. The USEPA categorizes regulated inert ingredients into the following four lists (http://www.epa.gov/opprd001/inerts/index.html):

- List 1 – Inert Ingredients of Toxicological Concern
- List 2 – Potentially Toxic Inert Ingredients
- List 3 – Inerts of Unknown Toxicity

- List 4 – Inerts of Minimal Toxicity

Several of the List 4 compounds are naturally occurring earthen materials (e.g., clay materials, simple salts) that would not elicit toxicological response at applied concentrations. However, some of the inerts (particularly the List 3 compounds and unlisted compounds) may have moderate to high potential toxicity to aquatic species based on MSDSs or published data.

Comprehensively assessing potential effects to non-target fish, wildlife, plants, and/or their habitats from pesticide use is a complex task. It would be preferable to assess the cumulative effects from exposure to the active ingredient, its degradates, and inert ingredients as well as other active ingredients in the spray mixture. However, it would only be feasible to conduct deterministic risk assessments for each component in the spray mixture singly. Limited scientific information is available regarding ecological effects (additive or synergistic) from chemical mixtures that typically rely upon broadly encompassing assumptions. For example, the USFS (2005) found that mixtures of pesticides used in land (forest) management likely would not cause additive or synergistic effects to non-target species based upon a review of scientific literature regarding toxicological effects and interactions of agricultural chemicals (Agency for Toxic Substances and Disease Registry [ATSDR] 2004). Moreover, information on inert ingredients, adjuvants, and degradates is often limited by the availability of and access to reliable toxicological data for these constituents.

Toxicological information regarding “other ingredients” may be available from sources such as the following:

- Toxicology, Occupational Medicine, and Environmental Series (TOMES) (a proprietary toxicological database including USEPA’s Integrated Risk Information System (IRIS), the Hazardous Substance Data Bank, and the Registry of Toxic Effects of Chemical Substances [RTECS]).
- USEPA’s ECOTOX database, which includes AQUIRE (a database containing scientific papers published on the toxic effects of chemicals to aquatic organisms).
- TOXLINE (a literature searching tool).
- MSDSs from pesticide suppliers.
- Other sources such as the *Farm Chemicals Handbook*.

Because there is a lack of specific inert toxicological data, inert(s) in a pesticide may cause adverse ecological effects. However, inert ingredients typically represent only a small percentage of the pesticide spray mixture, and it would be assumed that negligible effects would be expected to result from inert ingredient(s).

Although the potential effects of degradates should be considered when selecting a pesticide, it is beyond the scope of this assessment process to consider all possible breakdown chemicals of the various product formulations containing an active ingredient. Degradates may be more or less mobile and more or less hazardous in the environment than their parent pesticides (Battaglin et al. 2003). Differences in environmental behavior (e.g., mobility) and toxicity between parent pesticides and degradates would make assessing potential degradate effects extremely difficult. For example, a less toxic and more mobile, bioaccumulative, or persistent degradate may have potentially greater effects on species and/or degrade environmental quality. The lack of data on the toxicity of degradates for many pesticides would represent a source of uncertainty for assessing risk.

A USEPA-approved label specifies whether a product can be mixed with one or more pesticides. Without product-specific toxicological data, it would not possible to quantify the potential effects of these mixtures. In addition, a quantitative analysis could only be conducted if reliable scientific information allowed a determination of whether the joint action of a mixture would be additive, synergistic, or antagonistic. Such information would not likely exist unless the mode of action would be common among the chemicals and receptors. Moreover, the composition of and exposure to mixtures would be highly site- and/or time-specific and, therefore, it would be nearly impossible to assess potential effects to species and environmental quality.

To minimize or eliminate potential negative effects associated with applying two or more pesticides as a mixture, the use would be conducted in accordance with the labeling requirements. Labels for two or more pesticides applied as a mixture should be completely reviewed, where products with the least potential for negative effects would be selected for use on the refuge. This is especially relevant when a mixture would be applied in a manner that may already have the potential for an effect(s) associated with an individual pesticide (e.g., runoff to ponds in sandy watersheds). Use of a tank mix under these conditions would increase the level of uncertainty in terms of risk to species or potential to degrade environmental quality.

Adjuvants generally function to enhance or prolong the activity of pesticide. For terrestrial herbicides, adjuvants aid in the absorption into plant tissue. “Adjuvant” is a broad term that generally applies to surfactants, selected oils, anti-foaming agents, buffering compounds, drift control agents, compatibility agents, stickers, and spreaders. Adjuvants are not under the same registration requirements as pesticides, and the USEPA does not register or approve the labeling of spray adjuvants. Individual pesticide labels identify types of adjuvants approved for use with the pesticide. In general, adjuvants compose a relatively small portion of the volume of pesticides applied. Selection of adjuvants with limited toxicity and low volumes would be recommended to reduce the potential for the adjuvant to influence the toxicity of the pesticide.

G.7.4 Determining Effects to Soil and Water Quality

The approval process for pesticide uses would consider potential to degrade water quality on and off refuge lands. A pesticide can only affect water quality through movement away from the treatment site. After application, pesticide mobilization can be characterized by one or more of the following (Kerle et al. 1996):

- Attach (sorb) to soil, vegetation, or other surfaces and remain at or near the treated area;
- Attach to soil and move off-site through erosion from runoff or wind;
- Dissolve in water that can be subjected to runoff or leaching.

As an initial screening tool, selected chemical characteristics and rating criteria for a pesticide can be evaluated to assess potential to enter ground and/or surface waters. These would include the following: persistence, sorption coefficient (K_{oc}), groundwater ubiquity score (GUS), and solubility.

Persistence, which is expressed as half-life ($t_{½}$), represents the length of time required for 50% of the deposited pesticide to degrade (completely or partially). Persistence in the soil can be categorized as the following: non-persistent <30 days, moderately persistent = 30 to 100 days, and persistent >100 days (Kerle et al. 1996). Half-life data is usually available for aquatic and terrestrial environments.

Another measure of pesticide persistence is dissipation time (DT_{50}). It represents the time required for 50% of the deposited pesticide to degrade and move from a treated site, whereas half-life describes the rate for degradation only. As for half-life, units of dissipation time are usually expressed in days. Field or foliar dissipation times are the preferred data for use to estimate pesticide concentrations in the environment. However, soil half-life is the most common persistence data cited in published literature. If field or foliar dissipation data are not available, soil half-life data may be used. The average or representative half-life value of most important degradation mechanisms will be selected for quantitative analysis for both terrestrial and aquatic environments.

Mobility of a pesticide is a function of how strongly it is adsorbed to soil particles and organic matter, its solubility in water, and its persistence in the environment. Pesticides strongly adsorbed to soil particles, relatively insoluble in water, and not environmentally persistent would be less likely to move across the soil surface into surface waters or to leach through the soil profile and contaminate groundwater. Conversely, pesticides that are not strongly adsorbed to soil particles, are highly water soluble, and are persistent in the environment would have greater potential to move from the application site (off-site movement).

The degree of pesticide adsorption to soil particles and organic matter (Kerle et al. 1996) is expressed as the soil adsorption coefficient (K_{oc}). The soil adsorption coefficient is measured as micrograms of pesticide per gram of soil (µg/g) and can range from near zero to the thousands. Pesticides with higher K_{oc} values are strongly sorbed to soil and, therefore, would be less subject to movement.

Water solubility describes the amount of pesticide that will dissolve in a known quantity of water. The water solubility of a pesticide is expressed as milligrams of pesticide dissolved in a liter of water (mg/L or ppm). Pesticides with solubility <0.1 ppm are virtually insoluble in water; those with solubility 100 to 1,000 ppm are moderately soluble, and those with solubility >10,000 ppm are highly soluble (U.S. Geological Survey [USGS] 2000). As pesticide solubility increases, there would be greater potential for off-site movement.

The GUS is a quantitative screening tool to estimate a pesticide's potential to move in the environment. It uses soil persistence and adsorption coefficients in the following formula.

$$GUS = \log_{10}(t_{½}) \times [4 - \log_{10}(K_{oc})]$$

The potential pesticide movement rating would be based upon its GUS value. Pesticides with a GUS <0.1 would considered to have an extremely low potential to move toward groundwater. Values of 1.0 to 2.0 would be low, 2.0 to 3.0 would be moderate, 3.0 to 4.0 would be high, and >4.0 would have a very high potential to move toward groundwater.

Water solubility describes the amount of pesticide dissolving in a specific quantity of water, where it is usually measured as mg/L or ppm. Solubility is useful as a comparative measure because pesticides with higher values are more likely to move by runoff or leaching. GUS, water solubility, $t_{½}$, and K_{oc} values are available for selected pesticides from the Oregon State University (OSU) Extension Pesticide Properties Database at http://npic.orst.edu/ppdmove.htm. Many of the values in this database were derived from the Soil Conservation Service (SCS)/Agricultural Research Service (ARS)/Cooperative Extension service (CES) Pesticide Properties Database for Environmental Decision Making (Wauchope et al. 1992).

Soil properties influence the fate of pesticides in the environment. The following six properties are mostly likely to affect pesticide degradation and the potential for pesticides to move off-site by leaching (vertical movement through the soil) or runoff (lateral movement across the soil surface).

- Permeability is the rate of water movement vertically through the soil. It is affected by soil texture and structure. Coarse-textured soils (e.g., high sand content) have a larger pore size and are generally more permeable than fine-textured soils (i.e., high clay content). The more permeable soils would have a greater potential for pesticides to move vertically down through the soil profile. Soil permeability rates (inches/hour) are usually available in county soil survey reports.
- Soil texture describes the relative percentage of sand, silt, and clay. In general, greater clay content with smaller pore size would lower the likelihood and rate that water would move through the soil profile. Clay also serves to adsorb (bind) pesticides to soil particles. Soils with high clay content would adsorb more pesticide than soils with relatively low clay content. In contrast, sandy soils with coarser texture and lower water-holding capacity would have a greater potential for water to leach through them.
- Soil structure describes soil aggregation. Soils with a well-developed soil structure have a looser, more aggregated structure that would be less likely to be compacted. Both characteristics allow for less restricted flow of water through the soil profile, resulting in greater infiltration.
- Organic matter would be the single most important factor affecting pesticide adsorption in soils. Many pesticides are adsorbed to organic matter, which would reduce their rate of downward movement through the soil profile. Also, soils high in organic matter would tend to hold more water, which may make less water available for leaching.
- Soil moisture affects how fast water would move through the soil. If soils are already wet or saturated before rainfall or irrigation, excess moisture would runoff rather than infiltrate into the soil profile. Soil moisture also would influence microbial and chemical activity in soil, which affects pesticide degradation.
- Soil pH would influence chemical reactions that occur in the soil, which in turn determines whether a pesticide will degrade, the rate of degradation, and, in some instances, which degradation products are produced.

Based upon the aforementioned properties, soils most vulnerable to groundwater contamination would be sandy soils with low organic matter. In contrast, the least vulnerable soils would be well-drained clayey soils with high organic matter. Consequently, pesticides with the lowest potential for movement in conjunction with appropriate BMPs (see below) would be used in an IPM framework to treat pests while minimizing effects to non-target biota and protecting environmental quality.

Along with soil properties, the potential for a pesticide to affect water quality through runoff and leaching would consider site-specific environmental and abiotic conditions including rainfall, water table conditions, and topography (Huddleston 1996).

- Water is necessary to separate pesticides from soil. This can occur in two basic ways. Pesticides that are soluble move easily with runoff water. Pesticide-laden soil particles can be dislodged and transported from the application site in runoff. The concentration of pesticides in the surface runoff would be greatest for the first runoff event following treatment. The rainfall intensity and route of water infiltration into soil, to a large extent, determine pesticide concentrations and losses in surface runoff. The timing of the rainfall after application also

would have an effect. Rainfall interacts with pesticides at a shallow soil depth (¼ to ½ inch), which is called the mixing zone (Baker and Miller 1999). The pesticide/water mixture in the mixing zone would tend to leach down into the soil or runoff depending upon how quickly the soil surface becomes saturated and how rapidly water can infiltrate into the soil. Leaching would decrease the amount of pesticide available near the soil surface (mixing zone) to runoff during the initial rainfall event following application and subsequent rainfall events.

- Terrain slope would affect the potential for surface runoff and the intensity of runoff. Steeper slopes would have greater potential for runoff following a rainfall event. In contrast, soils that are relatively flat would have little potential for runoff, except during intense rainfall events. In addition, soils in lower areas would be more susceptible to leaching as a result of receiving excessive water from surrounding higher elevations.
- Depth to groundwater would be an important factor affecting the potential for pesticides to leach into groundwater. If the distance from the soil surface to the top of the water table is shallow, pesticides would have less distance to travel to reach groundwater. Shallower water tables that persist for longer periods would be more likely to experience groundwater contamination. Soil survey reports are available for individual counties. These reports provide data in tabular format regarding the water table depths and the months during which it persists. In some situations, a hard pan exists above the water table that would prevent pesticide contamination from leaching.

G.7.5 Determining Effects to Air Quality

Pesticides may volatilize from soil and plant surfaces and move from the treated area into the atmosphere. The potential for a pesticide to volatilize is determined by the pesticide's vapor pressure, which would be affected by temperature, sorption, soil moisture, and the pesticide's water solubility. Vapor pressure is often expressed in mm Hg. To make these numbers easier to compare, vapor pressure may be expressed in exponent form ($I \times 10^{-7}$), where "I" represents a vapor pressure index. In general, pesticides with $I<10$ would have a low potential to volatilize, whereas pesticides with $I>1{,}000$ would have a high potential to volatilize (OSU 1996). Vapor pressure values for pesticides are usually available in the pesticide product MSDS or the USDA ARS pesticide database.

G.7.6 Preparing a Chemical Profile

The following instructions would be used by Service personnel to complete Chemical Profiles for pesticides. Specifically, profiles would be prepared for pesticide active ingredients (e.g., glyphosate, imazapic) that would be contained in one or more trade name products that are registered and labeled with USEPA. All information fields under each category (e.g., Toxicological Endpoints, Environmental Fate) would be completed for a Chemical Profile. If no information is available for a specific field, then "No data is available in references" would be recorded in the profile. Available scientific information would be used to complete Chemical Profiles. Each entry of scientific information would be shown with applicable references.

Completed Chemical Profiles would provide a structured decision-making process using quantitative assessment/screening tools with threshold values (where appropriate) that would be used to evaluate potential biological and other environmental effects to refuge resources. For ecological risk assessments presented in these profiles, the "worst-case scenario" would be evaluated to determine whether a pesticide could be approved for use considering the maximum single application rate specified on pesticide labels for habitat management and croplands/facilities maintenance treatments

pertaining to refuges. Where the "worst-case scenario" likely would only result in minor, temporary, and localized effects to listed and nonlisted species with appropriate BMPs (see Section G.5), the proposed pesticide's use in a PUP would have a scientific basis for approval under any application rate specified on the label that is at or below rates evaluated in a Chemical Profile. In some cases, the Chemical Profile would include a lower application rate than the maximum labeled rate in order to protect refuge resources. As necessary, Chemical Profiles would be periodically updated with new scientific information or as pesticides with the same active ingredient are proposed for use on the refuge in PUPs.

Throughout this section, threshold values (to prevent or minimize potential biological and environmental effects) would be clearly identified for specific information presented in a completed Chemical Profile. Comparison with these threshold values provides an explicit scientific basis to approve or disapprove PUPs for habitat management and cropland/facilities maintenance on refuge lands. In general, PUPs would be approved for pesticides with Chemical Profiles where there would be no exceedances of threshold values. However, BMPs are identified for some screening tools that would minimize/eliminate potential effects (exceedance of the threshold value) as a basis for approving PUPs.

Date: Service personnel would record the date when the Chemical Profile is completed or updated. Chemical Profiles (e.g., currently approved pesticide use patterns) would be periodically reviewed and updated, as necessary. The most recent review date would be recorded on a profile to document when it was last updated.

Trade Name(s): Service personnel would accurately and completely record the trade name(s) from the pesticide label, which includes a suffix that describes the formulation (e.g., WP, DG, EC, L, SP, I, II, or 64). The suffix often distinguishes a specific product among several pesticides with the same active ingredient. Service personnel would record a trade name for each pesticide product with the same active ingredient.

Common Chemical Name(s): Service personnel would record the common name(s) listed on the pesticide label or MSDS for an active ingredient. The common name of a pesticide is listed as the active ingredient on the title page of the product label immediately following the trade name, and the MSDS, Section 2: Composition/Information on Ingredients. A Chemical Profile is completed for each active ingredient.

Pesticide Type: Service personnel would record the type of pesticide for an active ingredient as one of the following: herbicide, dessicant, fungicide, fumigant, growth regulator, insecticide, pisicide, or rodenticide.

EPA Registration Number(s): This number (EPA Reg. No.) appears on the title page of the label and MSDS, Section 1: Chemical Product and Company Description. It is not the EPA Establishment Number, which is usually located near it. Service personnel would record the EPA Reg. No. for each trade name product with an active ingredient based upon PUPs.

Pesticide Class: Service personnel would list the general chemical class for the pesticide (active ingredient). For example, Malathion is an organophosphate and carbaryl is a carbamate.

CAS (Chemical Abstract Service) Number: This number is often located in the second section (Composition/Information on Ingredients) of the MSDS. The MSDS table listing components usually contains this number immediately prior to or following the percent composition.

Other Ingredients: From the most recent MSDS for the proposed pesticide product(s), Service personnel would include any chemicals in the pesticide formulation not listed as the active ingredient and described as toxic or hazardous, or regulated under the Superfund Amendments and Reauthorization Act (SARA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Toxic Substances Control Act (TSCA), Occupational Safety and Health Administration (OSHA), State Right-to-Know, or other listed authorities. These are usually found in MSDS sections titled "Hazardous Identifications," "Exposure Control/Personal Protection," and "Regulatory Information." If concentrations of other ingredients are available for any compounds identified as toxic or hazardous, then Service personnel would record this information in the Chemical Profile by trade name. MSDS(s) may be obtained from the manufacturer, manufacturer's website, or from an online database maintained by Crop Data Management Systems, Inc. (see list below).

G.7.6.1 Toxicological Endpoints

Toxicological endpoint data would be collected for acute and chronic tests with mammals, birds, and fish. Data would be recorded for species available in the scientific literature. If no data are found for a particular taxonomic group, then "No data available in references" would be recorded as the data entry. Throughout the Chemical Profile, references (including toxicological endpoint data) would be cited using parentheses (#) following the recorded data.

Mammalian LD_{50}: For test species in the scientific literature, Service personnel would record available data for oral lethal dose (LD_{50}) in mg/kg-bw (body weight) or ppm-bw. The most common test species in scientific literature are rat and mouse. The lowest LD_{50} value found for a rat would be used as a toxicological endpoint for dose-based RQ calculations to assess acute risk to mammals (see Table G-1 in Section G.7.1).

Mammalian LC_{50}: For test species in the scientific literature, Service personnel would record available data for dietary lethal concentration (LC_{50}) as reported (e.g., mg/kg-diet or ppm-diet). The most common test species in scientific literature are rat and mouse. The lowest LC_{50} value found for a rat would be used as a toxicological endpoint for diet-based RQ calculations to assess acute risk (see Table G-1 in Section G.7.1).

Mammalian Reproduction: For test species listed in the scientific literature, Service personnel would record the test results (e.g., Lowest Observed Effect Concentration [LOEC], Lowest Observed Effect Level [LOEL], No Observed Adverse Effect Level [NOAEL], NOAEC) in mg/kg-bw or mg/kg-diet for reproductive test procedure(s) (e.g., generational studies [preferred], fertility, newborn weight). The most common test species available in scientific literature are rats and mice. The lowest NOEC, NOAEC, No Observed Effect Level [NOEL], or NOAEL test results found for a rat would be used as a toxicological endpoint for RQ calculations to assess chronic risk (see Table G-1 in Section G.7.1).

Avian LD_{50}: For test species available in the scientific literature, Service personnel would record values for oral lethal dose (LD_{50}) in mg/kg-bw or ppm-bw. The most common test species available in scientific literature are the bobwhite quail and mallard. The lowest LD_{50} value found for an avian

species would be used as a toxicological endpoint for dose-based RQ calculations to assess acute risk (see Table G-1 in Section G.7.1).

Avian LC_{50}: For test species available in the scientific literature, Service personnel would record values for dietary lethal concentration (LC_{50}) as reported (e.g., mg/kg-diet or ppm-diet). The most common test species available in scientific literature are the bobwhite quail and mallard. The lowest LC_{50} value found for an avian species would be used as a toxicological endpoint for dietary-based RQ calculations to assess acute risk (see Table G-1 in Section G.7.1).

Avian Reproduction: For test species available in the scientific literature, Service personnel would record test results (e.g., LOEC, LOEL, NOAEC, NOAEL) in mg/kg-bw or mg/kg-diet consumed for reproductive test procedure(s) (e.g., early life cycle, reproductive). The most common test species available in scientific literature are the bobwhite quail and mallard. The lowest NOEC, NOAEC, NOEL, or NOAEL test results found for an avian species would be used as a toxicological endpoint for RQ calculations to assess chronic risk (see Table G-1 in Section G.7.1).

Fish LC_{50}: For test freshwater or marine species listed in the scientific literature, Service personnel would record an LC_{50} in ppm or mg/L. The most common test species available in the scientific literature are bluegill, rainbow trout, and fathead minnow (marine). Test results for many game species may also be available. The lowest LC_{50} value found for a freshwater fish species would be used as a toxicological endpoint for RQ calculations to assess acute risk (see Table G-1 in Section G.7.1).

Fish Early Life Stage (ELS)/Life Cycle: For test freshwater or marine species available in the scientific literature, Service personnel would record test results (e.g., LOEC, NOAEL, NOAEC, Lowest Observable Adverse Effect Concentration [LOAEC] in ppm for test procedure(s) (e.g., early life cycle, life cycle). The most common test species available in the scientific literature are bluegill, rainbow trout, and fathead minnow. Test results for other game species may also be available. The lowest test value found for a fish species (preferably freshwater) would be used as a toxicological endpoint for RQ calculations to assess chronic risk (see Table G-1 in Section G.7.1).

Other: For test invertebrate as well as non-vascular and vascular plant species available in the scientific literature, Service personnel would record $LC_{50,}$ $LD_{50,}$ LOEC, LOEL, NOAEC, NOAEL, or EC_{50} (environmental concentration) values in ppm or mg/L. The most common test invertebrate species available in scientific literature are the honey bee and the water flea (*Daphnia magna*). Green algae (*Selenastrum capricornutum*) and pondweed (*Lemna minor*) are frequently available test species for aquatic non-vascular and vascular plants, respectively.

Ecological Incident Reports: After a site has been treated with pesticide(s), wildlife may be exposed to these chemical(s). When exposure is high relative to the toxicity of the pesticides, wildlife may be killed or visibly harmed (incapacitated). Such events are called ecological incidents. The USEPA maintains a database (Ecological Incident Information System) of ecological incidents. This database stores information extracted from incident reports submitted by various Federal and state agencies and non-government organizations. Information included in an incident report is date and location of the incident, type and magnitude of effects observed in various species, use(s) of pesticides known or suspected of contributing to the incident, and results of any chemical residue and cholinesterase activity analyses conducted during the investigation.

Incident reports can play an important role in evaluating the effects of pesticides by supplementing quantitative risk assessments. All incident reports for pesticide(s) with the active ingredient and associated information would be recorded.

G.7.6.2 Environmental Fate

Water Solubility: Service personnel would record values for water solubility (S_w), which describes the amount of pesticide that dissolves in a known quantity of water. S_w is expressed as mg/L (ppm). Pesticide S_w values would be categorized as one of the following: insoluble <0.1 ppm, moderately soluble = 100 to 1,000 ppm, highly soluble >10,000 ppm (USGS 2000). As pesticide S_w increases, there would be greater potential to degrade water quality through runoff and leaching.

S_w would be used to evaluate the potential for bioaccumulation in aquatic species (see Octanol-Water Partition Coefficient [K_{ow}] below).

Soil Mobility: Service personnel would record available values for soil adsorption coefficient (K_{oc} [µg/g]). It provides a measure of a chemical's mobility and leaching potential in soil. K_{oc} values are directly proportional to organic content, clay content, and surface area of the soil. K_{oc} data for a pesticide may be available for a variety of soil types (e.g., clay, loam, sand).

K_{oc} values would be used in evaluating the potential to degrade groundwater by leaching (see Potential to Move to Groundwater below).

Soil Persistence: Service personnel would record values for soil half-life, which represents the length of time (days) required for 50% of the deposited pesticide to degrade (completely or partially) in the soil. Based upon the $t_{½}$ value, soil persistence would be categorized as one of the following: non-persistent <30 days, moderately persistent = 30 to 100 days, and persistent >100 days (Kerle et al. 1996).

Threshold for Approving PUPs:

- If soil $t_{½} \leq 100$ days, then a PUP would be approved without additional BMPs to protect water quality.
- If soil $t_{½}$ >100 days, then a PUP would only be approved with additional BMPs specifically to protect water quality. One or more BMPs such as the following would be included in the Specific BMPs section to minimize potential surface runoff and leaching that can degrade water quality:
    - Do not exceed one application per site per year.
    - Do not use on coarse-textured soils where the ground water table is <10 feet and average annual precipitation >12 inches.
    - Do not use on steep slopes if substantial rainfall is expected within 24 hours or ground is saturated.

Along with K_{oc}, soil $t_{½}$ values would be used in evaluating the potential to degrade groundwater by leaching (see Potential to Move to Groundwater below).

Soil Dissipation: Dissipation time (DT_{50}) represents the time required for 50% of the deposited pesticide to degrade and move from a treated site, whereas soil $t_{½}$ describes the rate of degradation only. As for $t_{½}$, units of dissipation time are usually expressed in days. Field dissipation time would

be the preferred data for use to estimate pesticide concentrations in the environment because it is based upon field studies compared to soil $t_{½}$, which is derived in a laboratory. However, soil $t_{½}$ is the most common persistence data available in the published literature. If field dissipation data are not available, soil half-life data would be used in a Chemical Profile. The average or representative half-life value of most important degradation mechanism would be selected for quantitative analysis for both terrestrial and aquatic environments.

Based upon the DT_{50} value, environmental persistence in the soil would also be categorized as one of the following: non-persistent <30 days, moderately persistent = 30 to 100 days, and persistent >100 days.

Threshold for Approving PUPs:

- If soil $DT_{50} \leq 100$ days, then a PUP would be approved without additional BMPs to protect water quality.
- If soil DT_{50} >100 days, then a PUP would only be approved with additional BMPs specifically to protect water quality. One or more BMPs such as the following would be included in the Specific BMPs section to minimize potential surface runoff and leaching that can degrade water quality:
    - Do not exceed one application per site per year.
    - Do not use on coarse-textured soils where the ground water table is <10 feet and average annual precipitation >12 inches.
    - Do not use on steep slopes if substantial rainfall is expected within 24 hours or ground is saturated.

Along with K_{oc}, soil DT_{50} values (preferred over soil $t_{½}$) would be used in evaluating the potential to degrade groundwater by leaching (see Potential to Move to Groundwater below), if available.

Aquatic Persistence: Service personnel would record values for aquatic $t_{½}$, which represents the length of time required for 50% of the deposited pesticide to degrade (completely or partially) in water. Based upon the $t_{½}$ value, aquatic persistence would be categorized as one of the following: non-persistent <30 days, moderately persistent = 30 to 100 days, and persistent >100 days (Kerle et al. 1996).

Threshold for Approving PUPs:

- If aquatic $t_{½} \leq 100$ days, then a PUP would be approved without additional BMPs to protect water quality.
- If aquatic $t_{½}$ >100 days, then a PUP would only be approved with additional BMPs specifically to protect water quality. One or more BMPs such as the following would be included in the Specific BMPs section to minimize potential surface runoff and leaching that can degrade water quality:
    - Do not exceed one application per site per year.
    - Do not use on coarse-textured soils where the ground water table is <10 feet and average annual precipitation >12 inches.
    - Do not use on steep slopes if substantial rainfall is expected within 24 hours or ground is saturated.

Aquatic Dissipation: Dissipation time (DT_{50}) represents the time required for 50% of the deposited pesticide to degrade or move (dissipate), whereas aquatic $t_{½}$ describes the rate of degradation only. As for $t_{½}$, units of dissipation time are usually expressed in days. Based upon the DT_{50} value, environmental persistence in aquatic habitats would also be categorized as one of the following: non-persistent <30 days, moderately persistent = 30 to 100 days, and persistent >100 days.

Threshold for Approving PUPs:

- If aquatic $DT_{50} \leq 100$ days, then a PUP would be approved without additional BMPs to protect water quality.
- If aquatic $DT_{50} > 100$ days, then a PUP would only be approved with additional BMPs specifically to protect water quality. One or more BMPs such as the following would be included in the Specific BMPs section to minimize potential surface runoff and leaching that can degrade water quality:
    - Do not exceed one application per site per year.
    - Do not use on coarse-textured soils where the ground water table is <10 feet and average annual precipitation >12 inches.
    - Do not use on steep slopes if substantial rainfall is expected within 24 hours or ground is saturated.

Potential to Move to Groundwater: $GUS = \log_{10}(\text{soil } t_{½}) \times [4 - \log_{10}(K_{oc})]$. If a DT_{50} value is available, it would be used rather than a $t_{½}$ value to calculate a GUS score. Based upon the GUS value, the potential to move toward groundwater would be recorded as one of the following categories: extremely low potential<1.0, low - 1.0 to 2.0, moderate - 2.0 to 3.0, high - 3.0 to 4.0, or very high>4.0.

Threshold for Approving PUPs:

- If GUS $\leq$4.0, then a PUP would be approved without additional BMPs to protect water quality.
- If GUS >4.0, then a PUP would only be approved with additional BMPs specifically to protect water quality. One or more BMPs such as the following would be included in the Specific BMPs section to minimize potential surface runoff and leaching that can degrade water quality:
    - Do not exceed one application per site per year.
    - Do not use on coarse-textured soils where the ground water table is <10 feet and average annual precipitation >12 inches.
    - Do not use on steep slopes if substantial rainfall is expected within 24 hours or ground is saturated.

Volatilization: Pesticides may volatilize (evaporate) from soil and plant surfaces and move off-target into the atmosphere. The potential for a pesticide to volatilize is a function of its vapor pressure, which is affected by temperature, sorption, soil moisture, and the pesticide's water solubility. Vapor pressure is often expressed in mm Hg. To make these values easier to compare, vapor pressure would be recorded by Service personnel in exponential form ($I \times 10^{-7}$), where "I" represents a vapor pressure index. In general, pesticides with I<10 would have low potential to volatilize, whereas pesticides with I >1,000 would have a high potential to volatilize (OSU 1996). Vapor pressure values

for pesticides are usually available in the pesticide product MSDS or the USDA ARS pesticide database (see References).

Threshold for Approving PUPs:

- If I ≤1,000, then a PUP would be approved without additional BMPs to minimize drift and protect air quality.
- If I >1,000, then a PUP would only be approved with additional BMPs specifically to minimize drift and protect air quality. One or more BMPs such as the following would be included in the Specific BMPs section to reduce volatilization and potential to drift and degrade air quality:
    - Do not treat when wind velocities are <2 or >10 mph with existing or potential inversion conditions.
    - Apply large-diameter droplets possible for spray treatments.
    - Avoid spraying when air temperatures >85°F.
    - Use the lowest spray height possible above target canopy.
    - Where identified on the pesticide label, soil-incorporate pesticide as soon as possible during or after application.

Octanol-Water Partition Coefficient (K_{ow}): The octanol-water partition coefficient (K_{ow}) is the concentration of a pesticide in octanol and water at equilibrium at a specific temperature. Because octanol is an organic solvent, it is considered a surrogate for natural organic matter. Therefore, K_{ow} would be used to assess potential for a pesticide to bioaccumulate in tissues of aquatic species (e.g., fish). If K_{ow} >1,000 or S_w<1 mg/L *and* soil $t_{½}$>30 days, then there would be high potential for a pesticide to bioaccumulate in aquatic species such as fish (USGS 2000).

Threshold for Approving PUPs:

- If the potential for a pesticide to bioaccumulate in aquatic species is not high, then the PUP would be approved.
- If there is a high potential to bioaccumulate in aquatic species (K_{ow}>1,000 or S_w<1 mg/L *and* soil $t_{½}$>30 days), then the PUP would not be approved, except under unusual circumstances where approval would only be granted by the Washington Office.

Bioaccumulation/Bioconcentration: This is the physiological process where pesticide concentrations in tissue increase in biota because they are taken and stored at a faster rate than they are metabolized or excreted. The potential for bioaccumulation would be evaluated through bioaccumulation factors (BAFs) or bioconcentration factors (BCFs). Based upon BAF or BCF values, the potential to bioaccumulate would be recorded as one of the following: low = 0 to 300; moderate = 300 to 1,000; or high >1,000 (Calabrese and Baldwin 1993).

Threshold for Approving PUPs:

- If BAF or BCF≤1,000, then a PUP would be approved without additional BMPs.
- If BAF or BCF>1,000, then a PUP would not approved, except under unusual circumstances where approval would only be granted by the Washington Office.

G.7.6.3 Worst-Case Ecological Risk Assessment

Max Application Rates (acid equivalent [ae]): Service personnel would record the highest application rate of an active ingredient (ae basis) for habitat management and cropland/facilities maintenance treatments in this data field of a Chemical Profile. These rates can be found in Table CP.1 under the column heading "Max Product Rate – Single Application (lbs/acre – AI on acid equiv basis)." This table would be prepared for a Chemical Profile from information specified in labels for trade name products identified in PUPs. If these data are not available in pesticide labels, "NS" should be written, for "not specified on label" in this table.

EECs: An ECC represents potential exposure to fish and wildlife (birds and mammals) from using a pesticide. EECs would be derived by Service personnel using an USEPA screening-level approach (USEPA 2004). For each max application rate (see description under Max Application Rates [acid equivalent]), Service personnel would record two EEC values in a Chemical Profile; these would represent the worst-case terrestrial and aquatic exposures for habitat management and croplands/facilities maintenance treatments. For terrestrial and aquatic EEC calculations, see description for data entry under Presumption of Unacceptable Risk/Risk Quotients, which is the next field for a Chemical Profile.

Presumption of Unacceptable Risk/Risk Quotients: Service personnel would calculate and record acute and chronic RQs for birds, mammals, and fish using the provided tabular formats for habitat management and/or cropland/facilities maintenance treatments. RQs recorded in a Chemical Profile would represent the worst-case assessment for ecological risk. See Section G.7.2 for discussion regarding the calculations of RQs.

For aquatic assessments associated with habitat management treatments, RQ calculations would be based upon selected acute and chronic toxicological endpoints for fish, and the EEC would be derived from Urban and Cook (1986) assuming 100% overspray to an entire 1-foot-deep water body using the max application rate (ae basis [see above]).

For aquatic assessments associated with cropland/facilities maintenance treatments, RQ calculations would be done by Service personnel based upon selected acute and chronic toxicological endpoints for fish, and an EEC would be derived from the aquatic assessment in AgDRIFT model version 2.01 under Tier I ground-based application with the following input variables: max application rate (ae basis [see above]), low boom (20 inches), fine to medium/coarse droplet size, 20 swaths, USEPA-defined wetland, and 25-foot distance (buffer) from treated area to water.

See Section G.7.2.1.2 for more details regarding the calculation of EECs for aquatic habitats for habitat management and cropland/facilities maintenance treatments.

For terrestrial avian and mammalian assessments, RQ calculations would be done by Service personnel based upon dietary exposure, where the "short grass" food item category would represent the worst-case scenario. For terrestrial spray applications associated with habitat management and cropland/facilities maintenance treatments, exposure (EECs and RQs) would be determined using the Kanaga nomogram method through the USEPA's T-REX version 1.2.3. T-REX input variables would include the following: max application rate (acid basis [see above]) and pesticide half-life (days) in soil to estimate the initial, maximum pesticide residue concentration on general food items for terrestrial vertebrate species in short (<20 cm tall) grass.

For granular pesticide formulations and pesticide-treated seed with a unique route of exposure for terrestrial avian and mammalian wildlife, see Section G.7.2.1.1.2 for the procedure that would be used to calculate RQs.

All calculated RQs in both tables would be compared with Levels of Concern (LOCs) established by USEPA (see Table G-2 in Section G.7.2). If a calculated RQ exceeds an established LOC value (in brackets inside the table), then there would be a potential for an acute or chronic effect (unacceptable risk) to federally listed (T&E) species and nonlisted species. See Section G.7.2 for detailed descriptions of acute and chronic RQ calculations and comparison to LOCs to assess risk.

Threshold for approving PUPs:

- If RQs≤LOCs, then a PUP would be approved without additional BMPs.
- If RQs>LOCs, then a PUP would only be approved with additional BMPs specifically to minimize exposure (ecological risk) to bird, mammal, and/or fish species. One or more BMPs such as the following would be included in the Specific BMPs section to reduce potential risk to nonlisted or listed species:
    - Lower application rate and/or fewer number of applications so RQs≤LOCs.
    - For aquatic assessments (fish) associated with cropland/facilities maintenance, increase the buffer distance beyond 25 feet so RQs≤LOCs.

Justification for Use: Service personnel would describe the reason for using the pesticide-based control of specific pests or groups of pests. In most cases, the pesticide label would provide the appropriate information regarding control of pests to describe in the section.

Specific BMPs: Service personnel would record specific BMPs necessary to minimize or eliminate potential effects to non-target species and/or degradation of environmental quality from drift, surface runoff, or leaching. These BMPs would be based upon scientific information documented in previous data fields of a Chemical Profile. Where necessary and feasible, these specific practices would be included in PUPs as a basis for approval.

If there are no specific BMPs that are appropriate, then Service personnel would describe why the potential effects to refuge resources and/or degradation of environmental quality are outweighed by the overall resource benefit(s) from the proposed pesticide use in the BMPs section of the PUP. See Section G.5 of this document for a complete list of BMPs associated with mixing and applying pesticides appropriate for all PUPs with ground-based treatments that would be additive to any necessary, chemical-specific BMPs.

References: Service personnel would record scientific resources used to provide data/information for a Chemical Profile. They would use the number sequence to uniquely reference data in a Chemical Profile. The following online data resources are readily available for toxicological endpoint and environmental fate data for pesticides:

1. California Product/Label Database. Department of Pesticide Regulation, California Environmental Protection Agency. (http://www.cdpr.ca.gov/docs/label/labelque.htm#regprods)

2. ECOTOX database. Office of Pesticide Programs, USEPA, Washington, D.C. (http://cfpub.epa.gov/ecotox/)

3. Extension Toxicology Network (EXTOXNET) Pesticide Information Profiles. Cooperative effort of University of California-Davis, Oregon State University, Michigan State University, Cornell University, and University of Idaho through Oregon State University, Corvallis, Oregon. (http://extoxnet.orst.edu/pips/ghindex.html)

4. Food and Agriculture Organization (FAO) specifications and evaluations for plant protection products. Pesticide Management Unit, Plant Protection Services, Food and Agriculture Organization, United Nations. (http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/Pesticid/)

5. Human health and ecological risk assessments. Pesticide Management and Coordination, Forest Health Protection, USDA, USFS. (http://www.fs.fed.us/foresthealth/pesticide/risk.htm)

6. Pesticide Chemical Fact Sheets. Clemson University Pesticide Information Center. (http://entweb.clemson.edu/pesticid/Document/Labels/factshee.htm)

7. Pesticide Fact Sheets. Published by Information Ventures, Inc. for BLM, Department of Interior; Bonneville Power Administration, U.S. Department of Energy; and USFS. (http://infoventures.com/e-hlth/pesticide/pest-fac.html)

8. Pesticide Fact Sheets. National Pesticide Information Center. (http://npic.orst.edu/npicfact.htm)

9. Pesticide Fate Database. USEPA, Washington, D.C. (http://cfpub.epa.gov/pfate/home.cfm).

10. Pesticide product labels and material safety data sheets. Crop Data Management Systems, Inc. (CDMS) (http://www.cdms.net/pfa/LUpdateMsg.asp) or multiple websites maintained by agrichemical companies.

11. Registered Pesticide Products (Oregon database). Oregon Department of Agriculture. (http://www.oda.state.or.us/dbs/pest_products/search.lasso)

12. Regulatory notes. Pest Management Regulatory Agency, Health Canada, Ontario, Canada. (http://www.hc-sc.gc.ca/pmra-arla/)

13. Reptile and Amphibian Toxicology Literature. Canadian Wildlife Service, Environment Canada, Ontario, Canada. (http://www.cws-scf.ec.gc.ca/nwrc-cnrf/ratl/index_e.cfm)

14. Specific Chemical Fact Sheet – New Active Ingredients, Biopesticide Fact Sheet and Registration Fact Sheet. USEPA, Washington, D.C. (http://www.epa.gov/pestidides/factsheets/chemical_fs.htm)

15. U.S. EPA. 1997. Pesticide Regulation (PR) Notice 97-6. Washington, DC: U.S. Environmental Protection Agency. Available: http://www.epa.gov/PR_Notices/pr97-6.html.

16. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas. The Invasive Species Initiative. The Nature Conservancy. (http://tnsweeds.ucdavis.edu/handbook.html)

17. Wildlife Contaminants Online. USGS, Department of Interior, Washington, D.C. (http://www.pwrc.usgs.gov/contaminants-online/)

18. One-liner database. 2000. USEPA, Office of Pesticide Programs, Washington, D.C.

Chemical Profile

Date:			
Trade Name(s):		**Common Chemical Name(s):**	
Pesticide Type:		**EPA Registration Number:**	
Pesticide Class:		**CAS Number:**	
Other Ingredients:			

Toxicological Endpoints

Mammalian LD_{50}:	
Mammalian LC_{50}:	
Mammalian Reproduction:	
Avian LD_{50}:	
Avian LC_{50}:	
Avian Reproduction:	
Fish LC_{50}:	
Fish ELS/Life Cycle:	
Other:	

Ecological Incident Reports

Environmental Fate

Water solubility (S_w):	
Soil Mobility (K_{oc}):	
Soil Persistence ($t_{½}$):	
Soil Dissipation (DT_{50}):	
Aquatic Persistence ($t_{½}$):	
Aquatic Dissipation (DT_{50}):	
Potential to Move to Groundwater (GUS score):	
Volatilization (mm Hg):	
Octanol-Water Partition Coefficient (K_{ow}):	
Bioaccumulation/Biocentration:	**BAF:`** **BCF:**

Worst Case Ecological Risk Assessment

Max Application Rate (ai lbs/acre – ae basis)	**Habitat Management:** **Croplands/Facilities Maintenance:**
EECs	**Terrestrial (Habitat Management):** **Terrestrial (Croplands/Facilities Maintenance):** **Aquatic (Habitat Management):** **Aquatic (Croplands/Facilities Maintenance):**

Habitat Management Treatments:

Presumption of Unacceptable Risk		**Risk Quotient (RQ)**	
		Listed (T&E) Species	**Nonlisted Species**
Acute	Birds	[0.1]	[0.5]
	Mammals	[0.1]	[0.5]
	Fish	[0.05]	[0.5]
Chronic	Birds	[1]	[1]
	Mammals	[1]	[1]
	Fish	[1]	[1]

Cropland/Facilities Maintenance Treatments:

Presumption of Unacceptable Risk		Risk Quotient (RQ)	
		Listed (T&E) Species	Nonlisted Species
Acute	Birds	[0.1]	[0.5]
	Mammals	[0.1]	[0.5]
	Fish	[0.05]	[0.5]
Chronic	Birds	[1]	[1]
	Mammals	[1]	[1]
	Fish	[1]	[1]

Justification for Use:	
Specific Best Management Practices (BMPs):	
References:	

Table CP.1 Pesticide Name

Trade Name	Treatment Type[b]	Max Product Rate – Single Application (lbs/acre or gal/acre)	Max Product Rate -Single Application (lbs/acre - AI on acid equiv basis)	Max Number of Applications Per Season	Max Product Rate Per Season (lbs/acre/season or gal/acre/season)	Minimum Time Between Applications (Days)

[a] From each label for a pesticide identified in pesticide use proposals (PUPs), Service personnel would record application information associated with possible/known uses on Service lands.
[b] Treatment type: H – habitat management or CF – cropland/facilities maintenance. If a pesticide is labeled for both types of treatments (uses), then record separate data for H and CF applications.

G.8 References

AgDrift. 2001. A user's guide for AgDrift 2.04: a tiered approach for the assessment of spray drift of pesticides. Spray Drift Task Force, PO Box 509, Macon, MS.

ATSDR (Agency for Toxic Substances and Disease Registry). 2004. Guidance Manual for the Assessment of Joint Toxic Action of Chemical Mixtures. U.S. Department of Health and Human Services, Public Health Service, ATSDR, Division of Toxicology. 62 pp + appendices.

Baehr, C.H. and C. Habig. 2000. Statistical evaluation of the UTAB database for use in terrestrial nontarget organism risk assessment. Tenth Symposium on Environmental Toxicology and Risk Assessment, American Society of Testing and Materials. April 10-12, 2000 Toronto, Ontario, Canada.

Barry, T. 2004. Characterization of propanil prune foliage residues as related to propanil use patterns in the Sacramento Valley, CA. Proceedings of the International Conference on Pesticide Application for Drift Management. Waikoloa, HI. 15 pp.

Baker, J. and G. Miller. 1999. Understanding and reducing pesticide losses. Extension Publication PM 1495, Iowa State University Extension. Ames, IA. 6 pp.

Battaglin, W.A., E.M. Thurman, S.J. Kalkhoff, and S.D. Porter. 2003. Herbicides and transformation products in surface waters of the midwestern United States. Journal of the American Water Resources Association (JAWRA) 39(4):743-756.

Beyer, W.N., E. Conner, and S. Gerould. 1994. Estimates of soil ingestion by wildlife. Journal of

Wildlife Management 58:375-382.
BLM (Bureau of Land Management). 2007. Vegetation treatments using herbicides on Bureau of Land Management Lands in 17 western states Programmatic EIS (PEIS). Bureau of Land Management, Washington Office.
Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.B. Grace, J.E. Keeley et al. 2004. Effects of invasive alien plants on fire regimes. BioScience 54:77-88.
Butler, T., W. Martinkovic, and O.N. Nesheim. 1998. Factors influencing pesticide movement to ground water. Extension Publication PI-2, University of Florida, Cooperative Extension Service. Gainesville, FL. 4 pp.
Calabrese, E.J. and L.A. Baldwin. 1993. Performing ecological risk assessments. Chelsea, MI: Lewis Publishers.
Center, T.D., J.H. Frank, and F.A. Dray, Jr. 1997. Biological control. Pages 245-263 in: D. Simberloff, D.C. Schmitz, and T.C. Brown, eds. Strangers in paradise: impact and management of nonindigenous species in Florida. Washington, D.C.: Island Press.
Coombs, E.M., J.K. Clark, G.L. Piper, and A.F. Cofrancesco, Jr. 2004. Biological control of invasive plants in the United States. Corvallis, OR: Oregon State University Press. 467 pp.
Cox, R.D. and V.J. Anderson. 2004. Increasing native diversity of cheatgrass-dominated rangeland through assisted succession. Journal of Range Management 57:203-210.
Driver, C.J., M.W. Ligotke, P. Van Voris, B.D. McVeety, B.J. Greenspan, and D.B. Brown. 1991. Routes of uptake and their relative contribution to the toxicologic response of northern bobwhite (*Colinus virginianus*) to an organophosphate pesticide. Environmental Toxicology and Chemistry 10:21-33.
Dunning, J.B. 1984. Body weights of 686 species of North American birds. Western Bird Banding Association. Monograph No. 1.
EXTOXNET. 1993. Movement of pesticides in the environment. Pesticide Information Project of Cooperative Extension Offices of Cornell University, Oregon State University, University of Idaho, University of California Davis, and the Institute for Environmental Toxicology, Michigan State University. 4 pp.
Fletcher, J.S., J.E. Nellessen, and T.G. Pfleeger. 1994. Literature review and evaluation of the EPA food-chain (Kenega) nomogram, an instrument for estimating pesticide residues on plants. Environmental Toxicology and Chemistry 13:1383-1391.
Hasan, S. and P.G. Ayres. 1990. The control of weeds through fungi: principles and prospects. Tansley Review 23:201-222.
Huddleston, J.H. 1996. How soil properties affect groundwater vulnerability to pesticide contamination. EM 8559. Oregon State University Extension Service. 4 pp.
Kerle, E.A., J.J. Jenkins, and P.A. Vogue. 1996. Understanding pesticide persistence and mobility for groundwater and surface water protection. EM 8561. Oregon State University Extension Service. 8 pp.
Masters, R.A. and R.L. Shelley. 2001. Invited synthesis paper: principles and practices for managing rangeland invasive plants. Journal of Range Management 54:502-517.
Masters, R.A., S.J. Nissen, R.E. Gaussoin, D.D. Beran, and R.N. Stougaard. 1996. Imidazolinone herbicides improve restoration of Great Plains grasslands. Weed Technology 10:392-403.
Maxwell, B.D., E. Lehnhoff, and L.J. Rew. 2009. The rationale for monitoring invasive plant populations as a crucial step for management. Invasive Plant Science and Management 2:1-9.
Mineau, P., B.T. Collins, and A. Baril. 1996. On the use of scaling factors to improve interspecies extrapolation to acute toxicity in birds. Regulatory Toxicology and Pharmacology 24:24-29.
Moody, M.E. and R.N. Mack. 1988. Controlling the spread of plant invasions: the importance of nascent foci. Journal of Applied Ecology 25:1009-1021.
Mullin, B.H., L.W. Anderson, J.M. DiTomaso, R.E. Eplee, and K.D. Getsinger. 2000. Invasive Plant

Species. Council for Agricultural Science and Technology: Issue Paper 13:1-18.

Oregon State University. 1996. EXTOXNET-Extension Toxicology Network, Pesticide Information Profiles. Oregon State University, Corvallis, Oregon.

Pfleeger, T.G., A. Fong, R. Hayes, H. Ratsch, and C. Wickliff. 1996. Field evaluation of the EPA (Kanaga) nomogram, a method for estimating wildlife exposure to pesticide residues on plants. Environmental Toxicology and Chemistry 15:535-543.

Pope, R., J. DeWitt, and J. Ellerhoff. 1999. Pesticide movement: what farmers need to know. Extension Publication PAT 36, Iowa State University Extension, Ames, IA, and Iowa Department of Agriculture and Land Stewardship, Des Moines, IA. 6 pp.

Ramsay, C.A., G.C. Craig, and C.B. McConnell. 1995. Clean water for Washington: protecting groundwater from pesticide contamination. Extension Publication EB1644, Washington State University Extension. Pullman, WA. 12 pp.

Spray Drift Task Force. 2003. A summary of chemigation application studies. Spray Drift Task Force, Macon, MS.

Urban, D.J and N.J. Cook. 1986. Ecological risk assessment. EPA 540/9-85-001. U.S. Environmental Protection Agency, Office of Pesticide Programs, Washington D.C. 94 pp.

USEPA (U.S. Environmental Protection Agency). 1990. Laboratory test methods of exposure to microbial pest control agents by the respiratory route to nontarget avian species. EPA/600/3-90/070. Environmental Research Laboratory, Corvallis, OR.

USEPA. 1998. A comparative analysis of ecological risks from pesticides and their uses: background, methodology and case study. Environmental Fate and Effects Division, Office of Pesticide Programs, U.S. Environmental Protection Agency, Washington, D.C. 105 pp.

USEPA. 2004. Overview of the ecological risk assessment process in the Office of Pesticide Programs, U.S. Environmental Protection Agency: endangered and threatened species effects determinations. Office of Pesticide Programs, Washington, D.C. 101 pp.

USEPA. 2005a. Technical overview of ecological risk assessment risk characterization; Approaches for evaluating exposure; Granular, bait, and treated seed applications. U.S. Environmental Protection Agency, Office of Pesticide Programs, Washington, D.C. Available at: http://www.epa.gov/oppefed1/ecorisk_ders/toera_analysis_exp.htm. Accessed July 18, 2012.

USEPA. 2005b. User's guide TREX v1.2.3. U.S. Environmental Protection Agency, Office of Pesticide Programs, Washington, D.C. 22 pp. Available at: http://www.epa.gov/oppefed1/models/terrestrial/trex/t_rex_user_guide.htm. Accessed July 18, 2012.

USFS (U.S. Forest Service). 2005. Pacific Northwest Region invasive plant program: preventing and managing invasive plants. Final environmental impact statement. 359 pp.

USGS (U.S. Geological Survey). 2000. Pesticides in stream sediment and aquatic biota – current understanding of distribution and major influences. USGS Fact Sheet 092-00, U.S. Geological Survey, Sacramento, CA. 4 pp.

Wauchope, R.D., T.M. Buttler, A.G. Hornsby, P.M. Augustijn-Beckers, and J.P. Burt. 1992. The SCS/ARS/CES pesticide properties database for environmental decision making. Reviews of Environmental Contamination and Toxicology 123:1-155.

Woods, N. 2004. Australian developments in spray drift management. Proceedings of the International Conference on Pesticide Application for Drift Management, Waikoloa, HI. 8 pp.

Appendix H. Public Involvement

H.1 Public Involvement Efforts

Public involvement was sought in the early stages of development of the comprehensive conservation plan and environmental impact statement (CCP/EIS). Prior to beginning of public scoping, the Refuge created a Stakeholder Scoping Team to help identify people and organizations that would be interested in the CCP/EIS process. The team met in June 2010 and brainstormed organizations and individuals that could help provide information to the public about the CCP/EIS process and maximize public involvement, as well as outreach tools that could be used. Invitees to this team included representatives of the business, agricultural, hunting, recreation, conservation, and Hispanic communities.

Public involvement strategies included face-to-face meetings with community organizations, local, State, and Federal agencies, elected officials (or their aides), and Refuge users. To inform the broader public, invite discussion, and solicit feedback, the planning team also held open houses, provided a twice-a-month call-in line, and conducted weekly on-site field outreach. Field outreach included distributing pamphlets to visitors and engaging them in conversation regarding the CCP. The Refuge also maintained a website where CCP information could be found and where the public could print out comment forms or submit emails during the scoping phase. Below is a brief summary of the events, meetings, and outreach tools that were used in our scoping and public involvement efforts.

During the public scoping phase of the CCP, three issues appeared to be of most interest to Refuge stakeholders: surface water recreation, upland recreation, and hunting. Work sessions were created to continue discussion around these themes. Commenters with differing viewpoints and those that appeared willing to look for solutions to difficult issues, as well as local partners that had voiced interest in these themes, were invited to join these topic-based work sessions. The Refuge invited approximately 130 people (or their representatives) to attend the work sessions held from September 23 to September 25, 2010. Of those 130 invitees, 47 attended at least some part of the work sessions. Six members of the public also viewed the work sessions at some point during the three days. To view a summary of the work sessions, please visit the Deer Flat NWR Planning website at http://www.fws.gov/deerflat/refugeplanning.html.

H.1.1. Invitation to the Tribes

- May 27, 2010. Hard copy letters were mailed to Robert Bear, Tribal Chairman of Shoshone-Paiute Tribes; Alonzo Coby, Fort Hall Business Council (FHBC) Chairman of Shoshone-Bannock Tribes; and Samuel Penney, Chairman of the Nez Perce Tribe.
- May 12, 2011. Emails were sent to Robert Bear, Tribal Chairman of the Shoshone-Paiute Tribes, Brooklyn Baptiste, Chairman of the Nez Perce Tribe, and Nathan Small, FHBC Chairman of the Shoshone-Bannock Tribes to invite them to send a representative to the Extended Team Meetings.
- May 18, 2011. Received word from Brian Kelly and Meggan Laxalt-Mackay of the U.S. Fish and Wildlife Service (USFWS) Ecological Services office that the Shoshone-Paiute only want to be consulted through the “Wings and Roots” program. Since this time, Brian Kelly has taken the lead on attempting to reinstate a consultation process with this tribe. Since they requested that they not be consulted outside of this formal program, no further direct contact

was made with the tribe by the Ecological Services office. When the consultation process resumes, the Refuge will be a participant.

- May 25, 2011. Called and left messages for the chairmen of the Shoshone-Paiute, Shoshone-Bannock, and Nez Perce Tribes asking how they would like to be involved in the CCP process.
- September 20, 2011. Called and left messages for Nathan Small, FHBC Chairman of Shoshone-Bannock Tribes, and Brooklyn Baptiste, Chairman of the Nez Perce Tribe, asking them how they would like to be involved and letting them know that if there was no response by October 30, we would assume that they were not interested in participating in the process.
- August 29, 2011. Brian Kelly attempted to set up a consultation meeting with the Shoshone-Paiute for September 8, 2011. Unfortunately, the meeting never materialized.
- October 27, 2011. Attempted to contact the Natural Resources departments of the Nez Perce and Shoshone-Bannock Tribes. Left messages for Keith Lawrence and Yvette Tuell.
- November 1, 2011. Keith Lawrence of the Nez Perce Tribe contacted us to let us know that the Natural Resources department was not interested in being involved in the CCP in any way. He suggested that we contact their Cultural Resources department.
- November 3, 2011. Contacted Pat Baird, archaeologist for the Nez Perce Tribe, who said that they wanted to be notified of undertakings and that they wanted a hard copy of the Draft and Final CCP sent to the Nez Perce Tribe archaeologist and the tribal chairman. These contacts were added to the mailing list.

H.1.2 Meetings and Communication with Federal, State, or Local Elected Officials and Federal, State, or Local Agencies

H.1.2.1 Interagency Coordination Team

- May 27, 2010. Letters requesting involvement on the CCP Interagency Coordinating Team (ICT) were sent to U.S. senators and representatives, State of Idaho senators and representatives within the Lake Lowell districts, the Governor of Idaho, Canyon County commissioners, the mayors of Caldwell and Nampa, Bureau of Reclamation, Idaho Department of Fish and Game (IDFG), Idaho Department of Environmental Quality (IDEQ), Canyon County Parks Recreation and Waterways (CCPRW), and the Boise Project Board of Control.
- ICT Meetings
    - July 1, 2010. Attendees included representatives of IDEQ, Bureau of Reclamation, Canyon County Parks, Recreation and Waterways (CCPRW), Canyon County Commissioners, Senator Crapo’s office, Canyon County District 13, and the City of Caldwell.
    - November 30, 2010. Attendees included representatives of the City of Nampa, State Representative Christy Perry’s office, Canyon County Commissioners, CCPRW, Bureau of Reclamation, and the City of Caldwell.
    - May 27, 2011. Attendees included representatives of the City of Caldwell, IDEQ, Canyon County Commissioners, CCPRW, the offices of Senators Crapo and Risch, the office of Congressman Labrador, Canyon County Sheriff’s office, Idaho Department of Parks and Recreation, IDFG, and the City of Greenleaf.
    - March 14, 2013. Attendees included representatives of the offices of Senators Crapo and Risch, the office of Congressman Labrador, the Cities of Nampa, Caldwell, and

Greenleaf; Canyon County Commissioners, CCPRW, Canyon County Sheriff's Office, Boise Project Board of Control, IDFG, and Idaho Department of Parks and Recreation.

- ICT Updates
  - Updates were sent to the coordination team monthly. ICT updates were sent on August 2, 2010; September 9, 2010; October 8, 2010; November 10, 2010; January 12, 2011; February 22, 2011; March 21, 2011; May 4, 2011; June 9, 2011; July 27, 2011; August 30, 2011; September 29, 2011; October 25, 2011; November 30, 2011; December 22, 2011; February 6, 2012; February 23, 2012; April 2, 2012; April 27, 2012; May 31, 2012; July 2, 2012; August 2, 2012; September 5, 2012; October 4, 2012; November 1, 2012; November 29, 2012; January 3, 2013; March 18, 2013; April 25, 2013; June 6, 2013.
  - No ICT update was sent in December 2010, because of the meeting held at the end of November.
  - No ICT update was sent in April 2011. An update was sent in early May.
  - January 2012 update was sent the first week of February.
- Current Representatives on the ICT
  - Kathy Alder – Canyon County Commissioner
  - Tom Bicak – Director, CCPRW
  - Tom Dale – Mayor, City of Nampa
  - Joe Decker – Canyon County Public Information Officer
  - Paul Deveau – Project Manager, Boise Project Board of Control
  - Steve Dunn – Natural Resource Specialist, Bureau of Reclamation
  - Phil Hardy – Regional Director for Congressman Raul Labrador
  - Darrin Johnson – Director, Nampa Parks and Recreation
  - Dean Johnson – Lands Resource Supervisor, Idaho Department of Lands
  - Dustin Miller – Environmental Liaison for Governor Otter
  - Susan Miller – Executive Assistant to the Mayor of Caldwell
  - Lauri Monnot – Watershed Coordinator, IDEQ
  - Christy Perry – Representative for Canyon County District 13
  - Scott Reinecker – Regional Director, IDFG
  - John Revier – Deputy Chief of Staff for Congressman Simpson
  - Bryan Ricker – Regional Director for Senator Crapo
  - Mike Roach – Natural Resource Director for Senator Risch

H.1.2.2 Congressional Meetings/Tours (in addition to ICT involvement)

- May 27, 2010. Letters requesting involvement on the CCP ICT were sent to U.S. senators and representatives, State of Idaho senators and representatives within the Lake Lowell districts, the Governor of Idaho, Canyon County commissioners, the mayors of Caldwell and Nampa, Bureau of Reclamation, IDFG, Idaho DEQ, CCPRW, and the Boise Project Board of Control.
- May 26, 2011. Refuge Manager Jennifer Brown-Scott and Assistant Chief of Refuges Ben Harrison met with Senators Crapo and Risch, Congressman Simpson, and staff of Congressman Labrador in Washington D.C. to brief them on the preliminary draft alternatives.
- August 18, 2011. Refuge Manager Jennifer Brown-Scott, Chief of Refuges Robin West, Assistant Regional Director Richard Hannan, and Regional Director Robyn Thorson met with

representatives of Senators Crapo and Risch and Congressmen Labrador and Simpson to discuss public comment and future changes to the preliminary draft alternatives.

- March 20, 2013. Refuge Manager Jennifer Brown-Scott provided informational CCP presentation to aide of Congressman Labrador.

H.1.2.3 Presentations for Federal, State and County Agencies (in addition to ICT involvement)

- Sent out invitations in June 2010 for a presentation on August 3, 2010. No County employees responded.
- August 4, 2010. Held presentation for Idaho state agencies. Kurt Stieglitz, IDFG; Thomas Woolf, Idaho Department of Agriculture; Jim Vannoy, Idaho Department of Health and Welfare; and David Dahms, Idaho Department of Parks and Recreation attended.
- August 11, 2010. Met with Idaho Department of Lands to discuss management authority.
- October 11, 2011. Met with IDFG and discussed public comments and potential changes to the preliminary draft alternatives.
- March 14, 2013. Interagency coordinating team meeting.
- April 4, 2013. Ecological Services meeting.

H.1.3 Communication with the Public, Local Businesses, and Community Organizations

H.1.3.1 Presentations with Community/Business Organizations

- During scoping in summer 2010, we contacted over 40 nongovernmental organizations and State and county agencies to offer CCP question-and-answer sessions. We met with 23 groups, including the following:
    - June 10, 2010. Informational CCP presentation to Caldwell Kiwanis.
    - June 10, 2010. Informational CCP presentation to Southwest Idaho Birders Association.
    - June 16, 2010. Informational CCP presentation to Idaho Bass Federation Nation.
    - July 10, 2010. Brief speech at the Premier Bass Tournament weigh-in.
    - July 12, 2010. Informational CCP presentation to the board of Golden Eagle Audubon Society.
    - July 13, 2010. Informational CCP presentation to the Southern Idaho Sailing Association.
    - July 14, 2010. Informational CCP presentation to the Idaho-Oregon Snake River Water Trail Coalition.
    - July 20, 2010. Informational CCP presentation to the Southwest Irrigation District (SWID) Resource Conservation and Development.
    - July 21, 2010. Informational CCP presentation to the Friends of Deer Flat Refuge.
    - July 26, 2010. Informational CCP presentation to the Intermountain Jet Boat Association.
    - July 27, 2010. Informational CCP presentation to the Kiwanis Club.
    - August 4, 2010. Informational CCP presentation at the Boise Watershed Teacher Workshop.
    - August 9, 2010. Informational CCP presentation to the Western White Water Association.

  - August 10, 2010. Informational CCP presentation to the Idaho Waterfowl Association.
  - August 10, 2010. Brief presentation at the Caldwell Chamber of Commerce luncheon.
  - August 13, 2010. Speech to a floatplane club.
  - August 18, 2010. Informational CCP presentation to the Caldwell Rotary Club.
  - August 23, 2010. Informational CCP presentation to the Snake River Canyon Scenic Byway.
  - August 26, 2010. Informational CCP presentation to the Nampa Association of Realtors.
  - August 31, 2010. Informational CCP presentation to the Caldwell Optimist Club.
- Two requests for CCP presentations were received in the winter of 2011. Presentations were provided to the following organizations.
  - February 14, 2011. Informational CCP presentation to the Woman's Century Club.
  - March 13, 2011. Informational CCP presentation to the Nampa Exchange Club.
- During the preliminary draft alternatives comment period in summer 2011, we contacted 70 nongovernmental organizations to offer CCP question-and-answer sessions. We met with 28 groups, including the following.
  - June 6, 2011. Informational CCP presentation to Idaho Power.
  - June 6, 2011. Informational CCP presentation to Snake River Bassmasters.
  - June 8, 2011. Informational CCP presentation to the Nampa Exchange Club.
  - June 9, 2011. Informational CCP presentation to the Caldwell Kiwanis Club.
  - June 9, 2011. Informational CCP presentation to the Lower Boise Watershed Council.
  - June 14, 2011. Informational CCP presentation to the Nampa Lions Club.
  - June 17, 2011. Informational CCP presentation to a local floatplane club.
  - June 21, 2011. Informational CCP presentation to the Ada County Association of Realtors.
  - June 21, 2011. Informational CCP presentation to the Caldwell Exchange Club.
  - June 21, 2011. Informational CCP presentation to Southwest Idaho Resource Conservation and Development.
  - June 22, 2011. Informational CCP presentation to the Caldwell Optimist Club.
  - June 22, 2011. Informational CCP presentation to the Caldwell Rotary Club.
  - June 28, 2011. Informational CCP presentation to the Treasure Valley Kiwanis Club.
  - June 28, 2011. Informational CCP presentation to the Nampa Rotary Club.
  - June 28, 2011. Informational CCP presentation to Lakeside Bassmasters.
  - June 29, 2011. Informational CCP presentation to the Sunrise Rotary.
  - June 30, 2011. Informational CCP presentation to Idaho Water Sports.
  - July 6, 2011. Informational CCP presentation to Idaho Waterfowl Association.
  - July 7, 2011. Informational CCP presentation to Bass Federation Nation.
  - July 11, 2011. Informational CCP presentation to Western Whitewater Association.
  - July 12, 2011. Informational CCP presentation to Golden Eagle Audubon Society.
  - July 13, 2011. Informational CCP presentation to the Caldwell Chamber of Commerce.
  - July 15, 2011. Informational CCP presentation to the Boise Sailors Association.
  - July 21, 2011. Informational CCP presentation to the Nampa Kiwanis Club.
  - July 21, 2011. Informational CCP presentation to Idaho Bass Federation.
  - July 23, 2011. Informational CCP presentation to the Idaho Recreation Council.

  - July 25, 2011. Informational CCP presentation to the Snake River Canyon Scenic Byway.
  - January 1, 2012. Informational CCP presentation to the Parma Lion's club.
  - October 1, 2012. Informational CCP presentation to the Idaho RC & D.

- During the Draft CCP/EIS comment period in spring 2013, we contacted 76 agencies and nongovernmental organizations to offer CCP question-and-answer sessions. We met with 26 groups, including the following.
  - March 14, 2013. Informational CCP presentation to the Southern Idaho Birding Association.
  - March 16, 2013. Informational CCP presentation to the Friends of Deer Flat.
  - March 19, 2013. Informational CCP presentation to the Parma Lion's Club.
  - March 19, 2013. Informational CCP presentation to the Idaho Gem Fly.
  - March 19, 2013, Informational CCP presentation to Southwest Idaho Resource Conservation
  - March 20, 2013. Informational CCP presentation to the Caldwell Optimists.
  - March 20, 2013. Informational CCP presentation to the Caldwell Rotary Club.
  - March 20, 2013. Informational CCP presentation to the Nampa/Caldwell Association of Realtors.
  - March 20, 2013. Informational CCP presentation to Save Lake Lowell.
  - March 21, 2013. Informational CCP presentation to the Fly Fishers of Idaho.
  - March 25, 2013. Informational CCP presentation to the Intermountain Jet Boat Association.
  - March 26, 2013. Informational CCP presentation to the Golden Eagle Audubon Society.
  - April 2, 2013. Informational CCP presentation to the Lakeside Bassmasters.
  - April 4, 2013. Informational CCP presentation to the Idaho BASS Nation.
  - April 4, 2013. Informational CCP presentation to the BASS Federation.
  - April 8, 2013. Informational CCP presentation to Western Whitewater.
  - April 9, 2013. Informational CCP presentation to the Caldwell Chamber of Commerce.
  - April 9, 2013. Informational CCP presentation to the Nampa Rotary Club.
  - April 10, 2013. Informational CCP presentation to the Snake River Water Trail.
  - April 10, 2013. Informational CCP presentation to the Nampa Exchange Club.
  - April 20, 2013. Informational CCP presentation to the Boise Sailors Association.
  - April 25, 2013. Informational CCP presentation to the Sunrise Club.
  - April 29, 2013. Informational CCP presentation to the Canyon County Alliance for Responsible Growth.
  - April 30, 2013. Informational CCP presentation to the Caldwell Exchange club.
  - May 1, 2013. Informational CCP presentation to the Caldwell Lion's Club.
  - May 2, 2013. Informational CCP presentation to Caldwell Kiwanis.

H.1.3.2 Public Open Houses/Scoping Sessions

- July 28, 2010. Open House from 12:00 PM to 3:00 PM at the Refuge Visitor Center.
- August 20, 2010. Open House from 10:00 AM to 6:00 PM at the Refuge Visitor Center.
- August 21, 2010. Open House from 10:00 AM to 3:00 PM at the Refuge Visitor Center.

- September 23-24, 2010. Work Session 1. Participation was by invitation. The work sessions were open to public viewing.
- September 24-25, 2010. Work Session 2. Participation was by invitation. The work sessions were open to public viewing.
- June 3, 2011. Open House from 12:00 PM to 3:00 PM and 6:00 PM to 9:00 PM at the Refuge Visitor Center.
- June 4, 2011. Open House from 10:00 AM to 3:00 PM at the Refuge Visitor Center.
- July 8, 2011. Open House from 12:00 PM to 3:00 PM and 6:00 PM to 9:00 PM at the Refuge Visitor Center.
- July 9, 2011. Open House from 10:00 AM to 3:00 PM at the Refuge Visitor Center.
- March 29, 2013. Open House from 12:00 PM to 3:00 PM and 6:00 PM to 9:00 PM at the Refuge Visitor Center.
- March 30, 2013. Open House from 10:00 AM to 3:00 PM at the Refuge Visitor Center.
- April 26, 2013. Open House from 12:00 PM to 3:00 PM and 6:00 PM to 9:00 PM at the Refuge Visitor Center.
- April 27, 2013. Open House from 10:00 AM to 3:00 PM at the Refuge Visitor Center.

H.1.3.3 Field Outreach

- June 26, 2010. Staff outreach at Upper Dam East.
- July 1, 2010. Staff outreach at Gotts Point and Lower Dam Recreation Area.
- July 10, 2010. Staff outreach at Gotts Point, the Lower Dam Recreation Area, and the Lavender Festival.
- July 11, 2010. Staff outreach at the Lavender Festival.
- July 22, 2010. Staff outreach at the Lower Dam Recreation Area.
- July 30, 2010. Staff outreach at the Lower Dam Recreation Area, the Upper Dam, and Gotts Point.
- August 8, 2010. Staff outreach at Access #7, Lower Dam Recreation Area, Upper Dam East, and Upper Dam West.
- August 14, 2010. Staff outreach at the Lower Dam Recreation Area.
- August 27, 2010. Staff outreach at the Upper Dam West, Upper Dam East, Lower Dam Recreation Area, and Gotts Point.
- June 25-26, 2011. Staff outreach at the Boise Recreation Festival.
- July 8-9, 2011. Staff outreach at the Lavender Festival.

H.1.3.4 CCP Hotline

- June 23, 2010. Available 5:00 PM to 7:00 PM
- July 14, 2010. Available 5:00 PM to 7:00 PM
- July 28, 2010. Available 5:00 PM to 7:00 PM
- August 11, 2010. Available 5:00 PM to 7:00 PM
- August 25, 2010. Available 5:00 PM to 7:00 PM
- September 8, 2010. Available 5:00 PM to 7:00 PM

H.1.3.5 News Releases

The following CCP-related news releases were issued to over 100 statewide television, radio, and print media contacts.

- June 21, 2010. Announcement of start of CCP process and opportunities for comment.
- July 19, 2010. Announcement of upcoming open house about management plan.
- September 16, 2010. Announcement of CCP Work Sessions.
- December 28, 2010. Update on status of CCP planning and announcement of release of Planning Update #2.
- May 27, 2011. Announcement of comment period for preliminary draft alternatives.
- October 25, 2011. Update on status of CCP planning and announcement of release of Planning Update #4.
- March 15, 2013. Announcement of comment period for Draft CCP/EIS and release of Planning Update #5.

H.1.3.6 Press Coverage

- 2010. Idaho Bass Federation Nation, "Lake Lowell." http://idahobassfederationnation.com/yahoo_site_admin/assets/docs/1_IBFN_Header_2nd_Qtr_2010-Completed.17062425.pdf
- April 14, 2010. Idaho Press-Tribune, "Deer Flat Prepares to Update Conservation Guidelines." http://www.idahopress.com/news/deer-flat-prepares-to-update-conservation-guidelines/article_502215ae-4783-11df-9634-001cc4c002e0.html
- May 02, 2010. Idaho Press-Tribune, "County Seeks Full Access to Popular Recreation Spot." http://www.idahopress.com/news/county-seeks-full-access-to-popular-recreation-spot/article_26b61884-55af-11df-8b7c-001cc4c002e0.html
- May 02, 2010. KTVB, "Some residents want vehicle ban lifted on Lake Lowell recreation spot." http://www.ktvb.com/home/Some-SW-Idaho-residents-want-vehicle-ban-lifted-92636164.html
- May 02, 2010. NWCN, "Some Residents Want Vehicle Ban Lifted on Lake Lowell Recreation Spot." http://www.nwcn.com/news/idaho/Some-residents-want-vehicle-ban-lifted-on-Lake-Lowell-recreation-spot-92680184.html
- May 05, 2010. Idaho Press-Tribune, "Public Can Give Views on Lake Lowell Water." http://www.idahopress.com/news/public-can-give-views-on-lake-lowell-water/article_e36e2b28-580d-11df-acbc-001cc4c03286.html
- May 13, 2010. Idaho Press-Tribune, "Find Way to Open Gates at Gotts Point." http://www.idahopress.com/editorials/find-way-to-open-gates-at-gotts-point/article_6e42822c-5e43-11df-bb1c-001cc4c002e0.html
- June 16, 2010. Idaho Press-Tribune, "Lake Lowell Flush with Water." http://www.idahopress.com/news/lake-lowell-flush-with-water/article_d8417eec-7907-11df-af0a-001cc4c002e0.html
- June 21, 2010. Press release was sent to local press outlets informing the public of the start of public scoping and promoting the CCP hotline.
- June 21, 2010. Idaho Statesman, "Deer Flat National Wildlife Refuge Kicks Off Comprehensive Planning Process, Wants Public Comment."
- July 08, 2010. Idaho Press-Tribune, "Work begins on Deer Flat Wildlife Refuge Plan."

http://www.idahopress.com/news/work-begins-on-deer-flat-wildlife-refuge-plan/article_07500ab4-8a4c-11df-96bd-001cc4c03286.html

- July 08, 2010. Snake River Bassmasters, "July 8, 2010." http://www.srb.idahobassfed.com/news.htm
- July 19, 2010. Press release was sent to local press outlets informing them of the July and August open houses.
- July 24, 2010. Idaho Press-Tribune, "Refuge Meeting Plan Set for Wednesday." http://www.idahopress.com/news/refuge-meeting-plan-set-for-wednesday/article_928f891a-96e0-11df-9834-001cc4c002e0.html
- July 29, 2010. Idaho Press-Tribune, "Refuge Seeks to Save Water Sports." http://www.idahopress.com/news/refuge-seeks-to-save-water-sports/article_8d53518e-9b3b-11df-874a-001cc4c002e0.html
- August 09, 2010. Blue Ribbon Coalition, "IDAHO: Help Preserve Recreation on Lake Lowell." http://www.sharetrails.org/node/13092
- August 10, 2010. KIVI-TV, "Boaters Beware in Lake Lowell."
- August 10, 2010 KBOI AM 670, "Officials Urge Public Comment on Deer Flat National Refuge Plan."
- August 10, 2010. Big Fish Tackle, Idaho Fishing General, "Will they close lake lowell???" http://www.bigfishtackle.com/forum/gforum.cgi?do=post_view_flat;post=606371
- August 11, 2010. Idaho Press-Tribune, "Help Save Recreation on Lake Lowell." http://www.idahopress.com/opinion/editorial/help-save-recreation-on-lake-lowell/article_27eafdbe-a4dd-11df-b91d-001cc4c03286.html
- August 12, 2010. KTRV-TV, "Lake Lowell Activities Debate."
- August 12, 2011. Boise Riders, Motorcycle Talk, "Help Preserve Recreation on Lake Lowell." http://boiseriders.net/motorcycle-talk/8977-help-preserve-recreation-lake-lowell.html
- August 13, 2010. KIVI-TV, "Public to Weigh in on Lake Lowell Management Plan."
- August 13, 2010. Mike Crapo, United States Senator, "Lake Lowell Meeting Set to Discuss Future Boating." http://www.crapo.senate.gov/media/newsreleases/release_full.cfm?id=327192&
- August 14, 2010. KBOI, Story about boating, open houses, and comments.
- August 14, 2010. KBOI 2, "Change 'is coming' to Lake Lowell, Boaters Fear Worst." www.kboi2.com/news/local/100700244.html
- August 14, 2010. KTVB and NWCN, "Public Weighs in on Future of Boating at Lake Lowell." http://www.ktvb.com/news/Is-boating-at-Lake-Lowell-in-danger-100697609.html
- August 15, 2010. KTVB, "Wildlife Refuge Could Curtail Water Sports on Popular Lake." http://www.ktvb.com/news/local/64260402.html
- August 15, 2010. Idaho Press-Tribune, "Crowd Defends Lake Use." http://www.idahopress.com/news/crowd-defends-lake-use/article_78837816-a83c-11df-96ad-001cc4c002e0.html
- August 17, 2010. Idaho Statesman Blog, "Boaters Gear Up for Fight at Lake Lowell." http://voices.idahostatesman.com/2010/08/17/rockybarker/boaters_gear_fight_lake_lowell
- August 24, 2010. KTRV-TV "Canyon County Commissioners Call on Citizens."
- August 26, 2010. Idaho Press-Tribune, "'Save Lake Lowell' Meeting Today." http://www.idahopress.com/news/save-lake-lowell-meeting-today/article_22790ba0-b0d6-11df-8cb7-001cc4c002e0.html

- August 27, 2010. Idaho Press-Tribune, "'Save Lake Lowell' Group Meets." http://www.idahopress.com/news/save-lake-lowell-group-meets/article_74e24ece-b199-11df-bab1-001cc4c002e0.html
- August 29, 2010. Idaho Press-Tribune, Opinion, "Lake's Uses Must Be Balanced." http://www.idahopress.com/opinion/editorial/lake-s-uses-must-be-balanced/article_4d0989a8-b32e-11df-b457-001cc4c03286.html
- August 31, 2010. Idaho Press-Tribune, editorial opinion, "Burden of Proof Should Fall on Closing Refuge."
- August 31, 2010, KBOI AM 670, Sept. Lake Lowell Month to Save Recreation Activities on the Lake."
- September 01, 2010. KTRV-TV, "Commissioners Worry About Losing Lake Lowell."
- September 02, 2010. Idaho Press-Tribune, guest opinion, "We Must Honor Deer Flat's Original Purpose." http://www.idahopress.com/opinion/bestread/we-must-honor-deer-flat-s-original-purpose/article_14dd8458-b626-11df-a884-001cc4c03286.html
- September 02, 2010. Idaho Press-Tribune, "Officials Support Lowell Recreation." http://www.idahopress.com/news/officials-support-lowell-recreation/article_271668c8-b64f-11df-b26b-001cc4c002e0.htmls
- September 03, 2010. Idaho Press-Tribune, "Lake Lowell Issue Continues Debate."
- September 04, 2010. Idaho Press-Tribune, "Lowell Plan Shapes Future." http://www.idahopress.com/news/lowell-plan-shapes-future/article_4b2a1756-b8ab-11df-b7cf-001cc4c03286.html
- September 08, 2010. Idaho Press-Tribune, Deer Flat editorial opinion, "Wildlife, Recreation Can Co-exist." http://www.idahopress.com/opinion/bestread/wildlife-recreation-can-co-exist/article_d6f138ec-badf-11df-850c-001cc4c03286.html
- September 08, 2010. Idaho Statesman, "Lake Lowell Recreation Supporters Rally to Influence Refuge Planning."
- September 09, 2010. Idaho Press-Tribune, "Group Spearheads Opposition to Lake Restrictions." http://www.idahopress.com/news/group-spearheads-opposition-to-lake-restrictions/article_8505ad2a-bbc9-11df-a3ae-001cc4c002e0.html
- September 10, 2010. KTVB, "Refuge Managers Receive Hundreds of Comments on Future of Lake Lowell." http://www.ktvb.com/home/Refuge-managers-receive-hundreds-of-comments-on-future-of-Lake-Lowell-102736339.html
- September 10, 2010, "Small Cost - Big Fun" Idaho Adventures, "Deer Flat National Wildlife Refuge Accepting Public Comment Regarding 15 Year Conservation Plan - Last Day for Public Comment is Sept. 10th, 2010." http://smallcostbigfunidahoadventures.blogspot.com/2010/09/deer-flat-national-wildlife-refuge.html
- September 10, 2010. U.S. Congressman Mike Simpson, "Idaho Congressmen Advocate for Idaho with Department of Interior." http://simpson.house.gov/news/email/show.aspx?ID=USOHNXFZXPG5GTBZBJL24EEYXU
- September 11, 2010. Idaho Press-Tribune, "Simpson, Minnick Weigh in on Lake Lowell, Wolves." http://www.idahopress.com/news/local/simpson-minnick-weigh-in-on-lake-lowell-wolves/article_5e923b80-be2c-11df-8bd7-001cc4c03286.html
- September 12, 2010. Idaho State Journal, "Minnick, Simpson Send Letter Seeking Progress on Wolf Management, Lake Lowell Issues." http://www.idahostatejournal.com/news/local/minnick-simpson-send-letter-seeking-progress-

on-wolf-management-lake/article_485eaaf6-bd32-11df-a7cf-001cc4c03286.html?mode=jqm_com

- September 13, 2010. Northwest Cable News, "Refuge Managers Receive Hundreds of Comments on Future of Lake Lowell." http://www.nwcn.com/news/idaho/Refuge-managers-receive-hundreds-of-comments-on-future-of-Lake-Lowell-102782789.html
- September 15, 2010. ONEARTH Magazine and KBOI, "A Gem in the Desert or Garbage Dump?" http://www.kboi2.com/communities/nampa/193941521.html
- September 16, 2010. Press release was sent to local press outlets inviting the public to view the September Work Sessions.
- September 17, 2010. Idaho Press-Tribune, "Deer Flat to Host Use Plan Meetings." http://www.idahopress.com/news/deer-flat-to-host-use-plan-meetings/article_63225716-c214-11df-aecb-001cc4c03286.html
- September 21, 2010. Idaho Statesman, "Brainstorming Workshops Planned This Week for Deer Flat Conservation Plan."
- September 23, 2010. KTRV, "Boating Ban among Ideas at Lake Lowell Brainstorming Session."
- 2011. Idaho Sportsmen's Caucus Advisory Council, "ISCAC Position Memo on the Deer Flat National Wildlife Refuge Comprehensive Conservation Planning (CCP) Process." http://www.idahosportsmensconnection.com/ourview/pdf/2011DFNWRCCP.pdf
- January 01, 2011. The Idaho Bass Federation, "January 1, 2011." http://www.idahobassfed.com/fednews.htm
- January 02, 2011. Idaho Press-Tribune, "Lake Lowell users: We want to play." http://www.idahopress.com/news/lake-lowell-users-we-want-to-play/article_34dad0da-1639-11e0-84ce-001cc4c03286.html
- January 13, 2011. Idaho Press-Tribune, "Local Leaders Concerned about Deer Flat Outcome."
- January 15, 2011. Idaho Press-Tribune, "Delegation watches Deer Flat process." http://www.idahopress.com/news/delegation-watches-deer-flat-process/article_351c40c8-2071-11e0-8d8b-001cc4c03286.html
- February 21, 2011. Idaho Press-Tribune, "Deer Flat Debate Escalates." http://www.idahopress.com/news/deer-flat-debate-escalates/article_27d1ac04-3d87-11e0-8e94-001cc4c03286.html
- March 16, 2011. U.S. Congressman Mike Simpson, "Simpson Fights for Lake Lowell Access." http://simpson.house.gov/news/documentsingle.aspx?DocumentID=229665
- March 17, 2011. Idaho Press-Tribune, "Simpson Seeks Assurances on Lake Lowell."
- April 13, 2011. KTVB, "Canyon County Wants More Control over Wildlife Refuge." http://www.ktvb.com/home/Canyon-County-wants-more-control-over-wildlife-refuge-119808859.html
- April 14, 2011. Idaho Press-Tribune, "Local officials: Give us back Lake Lowell." http://www.idahopress.com/news/local-officials-give-us-back-lake-lowell/article_caf8d98a-6658-11e0-927e-001cc4c03286.html
- April 14, 2011. Refuge Watch, "New Threat to Deer Flat NWR in Idaho." http://www.refugewatch.org/2011/04/14/new-threat-to-deer-flat-nwr-in-idaho/
- April 15, 2011. The Westerner, "Canyon County leaders ask to make Deer Flat National Wildlife Refuge county property." http://thewesterner.blogspot.com/2011/04/canyon-county-leaders-ask-to-make-deer.html

- April 21, 2011. Idaho Press-Tribune, Opinion, "County control of Lake Lowell might be best alternative." http://www.idahopress.com/opinion/editorial/county-control-of-lake-lowell-might-be-best-alternative/article_30c00768-6bb6-11e0-9b76-001cc4c002e0.html
- May 04, 2011. Western Whitewater Association, "Deer Flat Refuge update 0511." http://www.westernwhitewater.org
- May 11, 2011. Idaho Press-Tribune, Opinion, "Commissioners' Lake Lowell letter misguided." http://www.idahopress.com/opinion/bestread/commissioners-lake-lowell-letter-misguided/article_e8530614-7b5b-11e0-9df9-001cc4c03286.html
- May 27, 2011. Boise Guardian, "Crapo Warns Of Choppy Waters For Lake Lowell Users." http://boiseguardian.com/2011/05/27/chopper-waters-ahead-for-lake-lowell-users/
- May 27, 2011. Idaho Press-Tribune, "Refuge officials present Lake Lowell options." http://www.idahopress.com/news/refuge-officials-present-lake-lowell-options/article_1343151a-8897-11e0-8440-001cc4c002e0.html
- May 27, 2011. KTVB, "Proposed Changes to Lake Lowell." http://www.ktvb.com/home/Proposed-changes-to-Lake-Lowell-122754999.html
- May 27, 2011. James E. Risch, US Senator for Idaho, "Statement on Deer Flat NWR Proposal." http://www.risch.senate.gov/public/index.cfm/pressreleases?ID=d52655e8-2482-4c3c-ba22-6f196ce12fa8
- May 27, 2011. Labrador Congress, "Statement on Fish & Wildlife Service CCP Affecting Lake Lowell." http://www.labrador4idaho.com/press-kit/statement-on-fish-wildlife-service-ccp-affecting-lake-lowell/
- May 27, 2011. Mike Crapo, United States Senator, "Crapo on Lake Lowell: If It Isn't Broken, Don't Fix It." http://www.crapo.senate.gov/media/newsreleases/release_full.cfm?id=333042&
- May 28, 2011. Idaho Press-Tribune, "Four Options, One Lake."
- May 28, 2011. Idaho Press-Tribune, "Refuge releases draft proposals for new wildlife plan." http://www.idahopress.com/news/refuge-releases-draft-proposals-for-new-wildlife-plan/article_836adfea-88e6-11e0-8609-001cc4c002e0.html
- May 28, 2011. Idaho Statesman, "Recreation Restrictions Loom for Lake Lowell."
- May 28, 2011. Meanchicken, River Jet Boating Forum, "Lake Lowell Planning update was released." http://meanchicken.net/webmain/forum/viewtopic.php?f=82&t=6374
- May 28, 2011. Politicalnews.me, "Crapo on Lake Lowell: If It Isn't Broken, Don't Fix It." http://politicalnews.me/?id=7699
- May 29, 2011. Idaho Press-Tribune, "In Idaho, refuge becomes venue for anti-fed fight." http://www.idahopress.com/news/state/in-idaho-refuge-becomes-venue-for-anti-fed-fight/article_8b4f116f-adcb-503e-8eb5-509a99a0de3b.html
- May 29, 2011. Westport News.
- May 31, 2011. Green Technology World, "Comments Sought on Deer Flat National Wildlife Refuge Preliminary Draft Alternatives - NEWS RELEASE." http://green.tmcnet.com/news/2011/05/31/5544771.htm
- May 31, 2011. Idaho Waterfowl Association Forums, General Discussion, "Deer Flat Proposals." http://www.idahowaterfowl.org/forums/index.php?action=printpage;topic=1665.0
- May 31, 2011. Mike Crapo, United States Senator, "Crapo Office Taking Public Comment in Nampa, Glenns Ferry, Horseshoe Bend." http://www.crapo.senate.gov/media/newsreleases/release_full.cfm?id=333056&

- May 31, 2011. Refuge Watch, "Management Plan for Deer Flat NWR Sparks More Controversy." http://www.refugewatch.org/2011/05/31/management-plan-for-deer-flat-nwr-sparks more-controversy/
- June 02, 2011. The Idaho Bass Federation, "June 2, 2011." http://www.idahobassfed.com/fednews.htm
- June 02, 2011. Snake River Bassmasters, "June 2, 2011." http://www.srb.idahobassfed.com/news.htm
- June 03, 2011. Idaho Association of Soil Conservation Districts, "Federal Legislative Roundup: June 3 to June 10, 2011." https://iascd.wordpress.com/tag/deer-flat-national-wildlife-refuge/
- June 09, 2011. Capital Press, "Farmers oppose recreation limits at Deer Flat lake." http://www.capitalpress.com/content/se-deer-flat-061011
- June 22, 2011. Idaho Press-Tribune, "Tea Party Boise plans Save Lake Lowell parade." http://www.idahopress.com/news/tea-party-boise-plans-save-lake-lowell-parade/article_580746dc-9c95-11e0-b5ae-001cc4c03286.html
- June 23, 2011. Idaho Press-Tribune, "Idaho Congressional Delegation requests Lake Lowell comment period extension." http://www.idahopress.com/news/idaho-congressional-delegation-requests-lake-lowell-comment-period-extension/article_b64ec7a2-9de3-11e0-a9f2-001cc4c03286.html
- June 24, 2011. Idaho Press-Tribune, "Idaho delegates want more public comments on lake." http://www.idahopress.com/news/state/idaho-delegates-want-more-public-comments-on-lake/article_b66ebd82-273d-57f3-b4b4-36f1333146d4.html
- June 24, 2011. KTVB, "Idaho Leaders Want More Public Comments on Lake Lowell." http://www.ktvb.com/home/Idaho-leaders-want-more-public-comments-on-Lake-Lowell-124518364.html
- June 25, 2011. Capital Press, "Idaho delegates want more public comments on lake." http://www.capitalpress.com/content/AP-lake-lowell-federal-fight-062411
- June 26, 2011. Refuge Watch, "Idaho Delegation Asks for 4-Month Extension of Deer Flat NWR Comment Period." http://www.refugewatch.org/2011/06/26/idaho-delegration-asks-for-4-month-extension-of-deer-flat-nwr-comment-period/
- June 28, 2011. The Idaho Bass Federation, "June 28, 2011." http://www.idahobassfed.com/fednews.htm
- July, 2011. The Golden Eagle, "Comments Sought on Deer Flat Birding and New Management Plan Proposals." http://www.goldeneagleaudubon.org/newsletter-pdfs/nl11/geas1107.pdf
- July 01, 2011. Refuge Forums, Idaho Flyaway Forum, "Attn IWA Members: Deer Flat Meeting 7/6 7pm." http://www.refugeforums.com/refuge/showthread.php?t=857902
- July 03, 2011. Idaho Press-Tribune, "What does Lake Lowell mean to you?" http://www.idahopress.com/news/local/what-does-lake-lowell-mean-to-you/article_3b6ec6b4-a544-11e0-9da6-001cc4c002e0.html
- July 05, 2011. Biking Bis, "Proposed bicycling ban at Idaho wildlife refuge could have far-reaching impacts." http://www.bikingbis.com/2011/07/05/proposed-bicycling-ban-at-idaho-wildlife-refuge-could-have-far-reaching-impacts/
- July 07, 2011. The Idaho Bass Federation, "July 7, 2011." http://www.idahobassfed.com/fednews.htm
- July 07, 2011. Idaho Bassmasters, "Lake Lowell - Important Message." http://www.idahobassmasters.org/club-news-and-updates/243-lake-lowell-important-message

- July 07, 2011. Idaho Press-Tribune, "Embroiled in fight, Idaho refuge meets with public." http://www.idahopress.com/news/state/embroiled-in-fight-idaho-refuge-meets-with-public/article_faf6cf20-0d30-51d8-9a51-aacbd819858b.html
- July 07, 2011. KTVB and KIVI, "Embroiled in Fight, Idaho Refuge Meets with Public." http://www.ktvb.com/home/Embroiled-in-fight-Idaho-refuge-meets-with-public-125158654.html
- July 07, 2011. Twin Rivers Cycling, "Proposed bicycling ban at Idaho wildlife refuge could have far-reaching impacts." http://twinriverscyclists.wordpress.com/2011/07/07/proposed-bicycling-ban-at-idaho-wildlife-refuge-could-have-far-reaching-impacts/
- July 09, 2011. KIVI, "The Day Recreation Died."
- July 10, 2011. Idaho Press-Tribune, "Boat lovers: Lake Lowell + restrictions = bad economy." http://www.idahopress.com/news/boat-lovers-lake-lowell-restrictions-bad-economy/article_be712c10-aabb-11e0-b00d-001cc4c002e0.html
- July 11, 2011. Capital Press, "Boat Parade Protests 'Death of Recreation'." http://www.capitalpress.com/content/se-death-of-recreation--071511
- July 14, 2011. Idaho Press-Tribune, Opinion, "3 plans I'd support for lake." http://www.idahopress.com/opinion/bestread/plans-i-d-support-for-lake/article_8c67d800-add0-11e0-a5a5-001cc4c03286.html
- July 16, 2011. The Idaho Bass Federation, "July 16, 2011." http://www.idahobassfed.com/fednews.htm
- July 16, 2011. Snake River Bassmasters, "July 16, 2011." http://www.srb.idahobassfed.com/news.htm
- July 21, 2011. Idaho Press-Tribune, "County commissioners continue Lake Lowell talks Friday." http://www.idahopress.com/news/local/government/county-commissioners-continue-lake-lowell-talks-friday/article_e0d4b5c0-b3d4-11e0-8722-001cc4c002e0.html
- July 21, 2011. Idaho Public Television, "Idaho's Deer Flat National Wildlife Refuge Plan Stirs Controversy."
- July 21, 2011. KUOW, EarthFix, "Idaho's Deer Flat National Wildlife Refuge Plan Stirs Controversy." http://EarthFix.kuow.org/communities/article/controversy-over-deer-flat-national-wildlife-refug/
- July 21, 2011. HCN.org, The Goat Blog, "Boats vs. birds." http://www.hcn.org/blogs/goat/boats-vs.-birds
- July 22, 2011. Aaron Kunz, "Fight over Deer Flat heats up as commissioners threaten to declare Lake Lowell a local historic property." http://aaronkunz.wordpress.com/2011/07/22/fight-over-deer-flat-heats-up-as-commissioners-threaten-to-declare-lake-lowell-a-local-historic-property/
- July 22, 2011. Idaho Press-Tribune, "County says Deer Flat has no authority over Lake Lowell." http://www.idahopress.com/news/local/government/county-says-deer-flat-has-no-authority-over-lake-lowell/article_4b5c14c2-b481-11e0-9b4e-001cc4c002e0.html
- July 22, 2011. KIVI, "Community Comes Together to Fight Government Take Over of Lake Lowell."
- July 22, 2011. KTVB, "Canyon County Says Feds Have No Rights on Lake Lowell." http://www.ktvb.com/home/Canyon-County-says-feds-have-no-rights-on-Lake-Lowell-126039193.html
- July 22, 2011. KUOW, EarthFix, "Local Idaho Officials Take On Feds Over National Wildlife Refuge." http://EarthFix.kuow.org/communities/article/commissioners-hope-making-lake-lowell-historic-pro/

- July 23, 2011. Idaho Press-Tribune, "County to feds: You don't have control over water." http://www.idahopress.com/news/county-to-feds-you-don-t-have-control-over-water/article_ac35a6dc-b4e0-11e0-95e8-001cc4c002e0.html
- July 23, 2011. Idaho Press-Tribune, "Officials argue for local control of Lake Lowell." http://www.idahopress.com/news/state/officials-argue-for-local-control-of-lake-lowell/article_64fd3ef1-aeff-5208-8f85-d26c665e8e7d.html
- July 25, 2011. Idaho Business Review, "Southwest Idaho officials argue for local control of Lake Lowell." http://idahobusinessreview.com/2011/07/25/southwest-idaho-officials-argue-for-local-control-of-lake-lowell/#ixzz2fq5IL29i
- July 29, 2011. Governor C. L. "Butch, "Idaho's comments on Lake Lowell." https://www.facebook.com/pages/Governor-C-L-Butch-Otter/292986829831?sk=notes#!/notes/governor-c-l-butch-otter/idahos-comments-on-lake-lowell/10150251047115770
- July 30, 2011. KTVB, "Otter Spars with Feds over Control of Lake Lowell." http://www.ktvb.com/home/Otter-spars-with-feds-over-control-of-Deer-Flat-126461363.html
- July 31, 2011. Idaho Press-Tribune, "Lake Lowell lawsuit ill-advised." http://www.idahopress.com/opinion/editorial/lake-lowell-lawsuit-ill-advised/article_589deba6-bb39-11e0-92a6-001cc4c002e0.html
- August 02, 2011. OPB, Environment, Oregon, "Deer Flat Puts A Name On Public Access Battle." http://www.opb.org/news/article/deer-flat-puts-name-public-access-battle/
- August 03, 2011. Idaho Press-Tribune, Opinion, "We don't concede feds control Lake Lowell." http://www.idahopress.com/opinion/bestread/we-don-t-concede-feds-control-lake-lowell/article_f41d80c6-bd89-11e0-bfb2-001cc4c03286.html
- August 10, 2011. Idaho Business Review, "Boating outfitters say Lake Lowell plan bad for business." http://idahobusinessreview.com/2011/08/10/boating-outfitters-say-lake-lowell-plan-bad-for-business/#ixzz2fq67oBDZ
- August 11, 2011. Capital Press, "State officials join fight over feds' lake grab." http://www.capitalpress.com/content/se-lake-lowell-081211
- August 16, 2011. Idaho Press-Tribune, "Feds have jurisdiction over Lake Lowell."
- August 25, 2011. Fox News, "Taking Liberties: Birds Vs. Boaters." http://www.foxnews.com/us/2011/08/25/taking-liberties-birds-vs-boaters/
- August 30, 2011. The View From Montana, "Story of Two Reservoirs: Lowell Lake ID & Georgetown Lake MT." http://tvfmontana.org/?p=139
- August 30, 2011. Western Whitewater Association, "Interagency Coordinating Team Monthly Update August 30, 2011." http://www.westernwhitewater.org/Pages%20Information/Temp/Deer%20Flat%20Interagency%20Coordinating%20Team%20august%202011.html
- September 2, 2011. Idaho Press-Tribune, Opinion, "There's too much carp going on at Lake Lowell." http://www.idahopress.com/opinion/editorials/there-s-too-much-carp-going-on-at-lake-lowell/article_f59e0dce-d51e-11e0-96c6-001cc4c002e0.html
- October 2011. B.A.S.S. Times, "Idaho anglers battle FWS for access on popular Lake Lowell."
- October 19, 2011. KUOW, EarthFix, "A 'Trust Forced on the West' Creates Balancing Act on Public Lands." http://earthfix.kuow.org/land/article/a-trust-forced-on-the-west-creates-balancing-act-o/
- October 20, 2011. Idaho Public Television, "The People's Land."

- October 25, 2011. KTVB, "Updated Conservation Plan for Deer Flat Refuge Released." http://www.ktvb.com/home/Updated-conservation-plan-for-Deer-Flat-Refuge-released-132564953.html
- October 26, 2011. Idaho Press-Tribune, "Public Affects Lowell Options." http://www.idahopress.com/news/public-affects-lake-lowell-options/article_85b6572e-ff98-11e0-ba7b-001cc4c03286.html
- October 26, 2011. Idaho Statesman, "Public input changes plan for Deer Flat."
- October 27, 2011. Idaho Press-Tribune, Opinion, "Modified Lake Lowell plan shows compromise." http://www.idahopress.com/opinion/editorial/modified-lake-lowell-plan-shows-compromise/article_3f39d570-004a-11e1-8f0a-001cc4c002e0.html
- November 03, 2011. Capital Press Publication, "Wildlife Agency backs off on Lake." http://www.capitalpress.com/content/SE-lake-lowell-update-110411
- November 11, 2011. Boise Weekly, "Wildlife vs. Recreation at Deer Flat Refuge?" http://www.boiseweekly.com/boise/wildlife-vs-recreation-at-deer-flat-refuge/Content?oid=2547778
- November 17, 2011. MagicValley.com, "Fear of Change Challenges Minidoka National Wildlife Refuge Update." http://magicvalley.com/news/local/mini-cassia/fear-of-change-challenges-minidoka-national-wildlife-refuge-update/article_e608d9b2-e4c2-5876-86f0-ba4dc8bd4e84.html
- December 23, 2011. Idaho Press-Tribune, "Vote on the top local news stories of 2011." http://www.idahopress.com/news/vote-on-the-top-local-news-stories-of/article_c711c71c-2d24-11e1-916e-001871e3ce6c.html
- January 1, 2012. Idaho Press-Tribune, "Top Local Stories of 2011." http://www.idahopress.com/news/local/top-local-stories-of/article_4d96c452-3439-11e1-a4da-001871e3ce6c.html
- February 2, 2012. Western Canyon Chronicle, "Jan 24th Presentation: Status of Wildlife Conservation Rulemaking for Lake Lowell."
- March 10, 2012. Idaho Press-Tribune, "Lake Lowell Focus of Joint Memorial." http://www.idahopress.com/news/local/lake-lowell-focus-of-joint-memorial/article_1b24c014-6a7b-11e1-b784-001871e3ce6c.html?TNNoMobile
- March 15, 2012. Southern Idaho Sailing Association, "Deer Flat National Wildlife Refuge Planning Update #5." http://www.idahosailing.com/lake_lowell_changes
- March 18, 2012. Idaho Press-Tribune, "Canyon County Sheriff Candidates Discuss Lake Lowell, Jail at Forum." http://www.idahopress.com/vip_headlines/canyon-county-sheriff-candidates-discuss-lake-lowell-jail-at-forum/article_f3747c6c-70c4-11e1-a8ff-001871e3ce6c.html
- March 29, 2012. Idaho Press-Tribune, "Deer Flat draft plan months away." April 02, 2012. Idaho Business Review, "Business Briefs." http://idahobusinessreview.com/2012/04/02/business-briefs-128/
- April 02, 2012. KTVB, "Draft plan for Deer Flat due out in June." http://www.ktvb.com/home/Draft-plan-for-Deer-Flat-due-out-in-June-145699075.html
- April 10, 2012. Idaho Press-Tribune, "Park Hopes to pull in water skiers." http://www.idahopress.com/vip_headlines/park-hopes-to-pull-in-water-skiers/article_08b56a02-82d4-11e1-8828-001a4bcf887a.html
- April 12, 2012. Idaho Press-Tribune, "Lowell Opens for boating Sunday." http://www.idahopress.com/news/local/lake-lowell-opens-for-boating-sunday/article_0acd899c-8459-11e1-8f0e-0019bb2963f4.html

- April 14, 2012. Idaho Press-Tribune, "Canyon County leaders plan for future."
- April 15, 2012. KTVB, "Lake Lowell opens for boating." http://www.ktvb.com/home/Lake-Lowell-opens-for-boating-147507655.html
- May 11, 2012. Idaho Statesman, Letters to the editor, "Support Christy Perry."
- May 27, 2012. Idaho Statesman, "Collision Course over Deer Flat plan?"
- June 8, 2012. Idaho Press-Tribune, "Sales of Sobba's book to benefit friends of 100-year-old Deer Flat." http://www.idahopress.com/news/local/sales-of-former-caldwell-police-chief-bob-sobba-s-book/article_ab1a2a90-b118-11e1-94b2-001a4bcf887a.html
- June 25, 2012. Canyon County, "Commissioners React to CCP Draft Proposal." http://www.canyonco.org/Home/Home-News/Archived-News/Commissioners-React-to-CCP-Draft-Proposal.aspx
- July 12, 2012. Capital Press, "County defends lake rights." http://www.capitalpress.com/content/SE-reservoir-fight-071312
- August 10, 2012. Idaho Press-Tribune, Opinion, "Remember: Irrigators built Lake Lowell." http://www.idahopress.com/members/remember-irrigators-built-lake-lowell/article_a19f47b2-e28b-11e1-a7f1-001a4bcf887a.html
- August 25, 2012. Idaho Press-Tribune, Your Views, "Commissioners put Historical Society in bind." http://www.idahopress.com/members/commissioners-put-historical-society-in-bind/article_f28c4ca6-ee48-11e1-aa47-0019bb2963f4.html
- November 28, 2012. Idaho Press-Tribune, "Refuge waits OK on draft conservation plan." http://www.idahopress.com/members/refuge-waits-ok-on-draft-conservation-plan/article_cb5574d8-391a-11e2-ae98-0019bb2963f4.html
- March 08, 2013. Keller Williams Realty, "Lake Lowell Nampa and Caldwell Idaho is Under Attack." http://bzybeerealtor.com/post/3653171/lake-lowell-nampa-and-caldwell-idaho-is-under-attack
- March 11, 2013. Idaho Press-Tribune, "Deer Flat to release conservation plan Friday." http://www.idahopress.com/news/local/deer-flat-to-release-conservation-plan-friday/article_b22bb782-8a7e-11e2-80ab-0019bb2963f4.html
- March 12, 2013. Idaho Statesman Blog, "Deer Flat is releasing a draft of its comprehensive plan on Friday, March 15." http://blogs.idahostatesman.com/deer-flat-is-releasing-a-draft-of-its-comprehensive-plan-on-friday-march-15/
- March 12, 2013. Idaho Press-Tribune, "Deer Flat will release conservation plan Friday." http://www.idahopress.com/members/deer-flat-will-release-conservation-plan-friday/article_5b52b90a-8ad9-11e2-b222-001a4bcf887a.html
- March 13, 2013. KBOI, "Refuge wants your input for Deer Flat management." http://www.kboi2.com/news/local/Nampa-Idaho-Lowell-lake-boats-deer-flat-198306751.html
- March 14, 2013. Idaho Press-Tribune, "New Deer Flat plan eliminates most of wake-free zone." http://www.idahopress.com/news/new-deer-flat-plan-eliminates-most-of-wake-free-zone/article_4fbdf21e-8cd5-11e2-a6de-0019bb2963f4.html
- March 14, 2013. KTVB, "Latest plan for Lake Lowell makes big splash." http://www.ktvb.com/home/Possible-management-plan-for-Lake-Lowell-satisfies-many-198345721.html
- March 15, 2013. Idaho Statesman blog, "Deer Flat National Wildlife Refuge releases latest management proposal." http://blogs.idahostatesman.com/deer-flat/#storylink=misearch

- March 15, 2013. Idaho Press-Tribune, "Deer Flat's new plan may cool controversy." http://www.idahopress.com/members/deer-flat-s-new-plan-may-cool-controversy/article_950322de-8d1d-11e2-8dda-001a4bcf887a.html
- March 15, 2013. The Idaho Bass Federation, "March 15, 2013." http://www.idahobassfed.com/fednews.htm
- March 16, 2013. Idaho Statesman, "Deer Flat draft plan released Friday." http://idahostatesman.com/2013/03/16/2494073/deer-flat-draft-plan-released.html#storylink=misearch
- March 17, 2013. Idaho Statesman, "Can Idaho manage public lands better than the feds?" (Does not specifically mention DFNWR) http://www.idahostatesman.com/2013/03/17/2495395/can-idaho-manage-public-lands.html
- March 17, 2013. Idaho Press-Tribune, "Feds release new draft plan for Deer Flat." http://www.idahopress.com/news/state/feds-release-new-draft-plan-for-deer-flat/article_41f787c6-247b-5f06-9b8a-7e2ee95f3f3d.html
- March 18, 2013. KINF 99.1 FM, "Feds release new draft plan for Deer Flat." http://www.idahonewsradio.com/breakinglocalnews/story.aspx?ID=1914465
- March 18, 2013. KUOW, EarthFix, "New Plan Seeks Wildlife-Recreation Balance At Idaho's Deer Flat Refuge." http://EarthFix.kuow.org/flora-and-fauna/article/new-plan-seeks-wildlife-recreation-balance-at-idah/
- March 21, 2013. Mike Crapo, United States Senator, "Delegation Encourages Lake Lowell Comments." http://www.crapo.senate.gov/media/newsreleases/release_full.cfm?id=341102
- March 22, 2013. Idaho Republicans, "Delegation Encourages Lake Lowell Comments." http://idgop.org/delegation-encourages-lake-lowell-comments/
- March 22, 2013. Idaho Travel Recreation, "Feds release new draft plan for Deer Flat." http://www.idahotravelrecreation.com/blog/2013/03/22/feds-release-draft-plan-deer-flat/
- March 22, 2013. Politicalnews.me, "Delegation Encourages Lake Lowell Comments." http://politicalnews.me/?id=22259
- March 23, 2013. Idaho Statesman, "What's on the horizon for Deer Flat?"
- March 23, 2013. Idaho Statesman, "New Deer Flat proposal aims to balance wildlife, recreation needs." http://idahostatesman.com/2013/03/23/2504254/whats-on-the-horizon-for-deer.html#storylink=misearch
- March 28, 2013. Idaho Statesman Blog, "Public comment, open house at Deer Flat National Wildlife Refuge Friday, Saturday." http://blogs.idahostatesman.com/public-comment-open-house-at-deer-flat-national-wildlife-refuge-friday-saturday/
- March 29, 2013. Idaho Press-Tribune, "Deer Flat Refuge to host open house." http://www.idahopress.com/members/deer-flat-refuge-to-host-open-house/article_5894da4c-9824-11e2-8bdb-0019bb2963f4.html
- March 30, 2013. Idaho Press-Tribune, "Lake Lowell enforcement duties concern county officials." http://www.idahopress.com/members/lake-lowell-enforcement-duties-concern-county-officials/article_0f10e25e-98f0-11e2-b3ab-0019bb2963f4.html
- April, 2013. Treasure Valley Back Country Horsemen, "April 2013 Newsletter." http://www.tvbch.com/TVBCH_newsletter_2013-04c.doc
- April 02, 2013. Capital Press, "Feds compromise on standoff over Lake Lowell proposal." http://www.capitalpress.com/content/SE-Deer-Flat-040513
- April 02, 2013. Idaho Bassmasters, "Urgent Response needed to Lake Lowell Planning Proposal." http://www.idahobassmasters.org/club-news-and-updates/289-urgent-response-needed-to-lake-lowell-planning-proposal

- April 03, 2013. Idaho Press-Tribune, "Credit all around for promising Lake Lowell proposal." http://www.idahopress.com/members/credit-all-around-for-promising-lake-lowell-proposal/article_ae783dfa-9bee-11e2-b74a-0019bb2963f4.html
- April 03, 2013. Capital Press, "Feds compromise on standoff over Lake Lowell proposal." http://www.capitalpress.com/content/SE-Deer-Flat-040513
- April 08, 2013. El.e.men'tal Idaho, "A Deer Flat National Refuge Center Plan Reboot." http://elementalidaho.org/2013/04/12/4813-a-deer-flat-national-refuge-center-plan-reboot/
- April 13, 2013. City-Data Forum, Boise area, "Lake Lowell closing due to overregulation??" http://www.city-data.com/forum/boise-area/1840581-lake-lowell-closing-due-overregulation.html
- April 19, 2013. Canyon Soil Conservation District, Spring Issue, "The Refuge's Draft CCP/EIS is Available for Public Comments."
- April 19, 2013. Assault n' Prepper, "Idaho: Hunting Included in New Management Plan for Deer Flat National Wildlife Refuge." http://assaultnprepper.com/blog/2013/04/idaho-hunting-included-in-new-management-plan-for-deer-flat-national-wildlife-refuge/
- April 19, 2013. NRA-ILA, "Idaho: Hunting Included in New Management Plan for Deer Flat National Wildlife Refuge." http://www.nraila.org/legislation/federal-legislation/2013/4/idaho-hunting-included-in-new-management-plan-for-deer-flat-national-wildlife-refuge.aspx?s=%22Oregon%22&st=&ps=
- May 09, 2013. Idaho Statesman Outdoors, "Lake Lowell Deadline for comments May 15."
- May 09, 2013. Idaho Press-Tribune, "Sailors critical of Deer Flat plan." http://www.idahopress.com/members/sailors-critical-of-deer-flat-plan/article_41420c5e-b861-11e2-8bb4-0019bb2963f4.html
- May 09, 2013. KBOI, "Feds aim to sink regatta at Lake Lowell." www.kboi2.com/news/local/lake-lowell-206986121.html
- May 10, 2013. Idaho Statesman, "Proposed Deer Flat changes too restrictive to recreationists."
- May 10, 2013. KTVB, "Sailboat races could be 'gone with the wind' under proposal." http://www.ktvb.com/home/Sailboat-races-could-be-gone-with-the-wind-under-proposal-207024261.html
- May 12, 2013. Idaho Press-Tribune, "Sailing group faces headwind at SW Idaho refuge." http://www.idahopress.com/news/state/sailing-group-faces-headwind-at-sw-idaho-refuge/article_656561c5-cdba-5b08-8178-6c44b58e7ec6.html
- May 13, 2013. Cruising Outpost Magazine, "Sailboat Regattas To Be Banned On Lake Lowell In Southern Idaho." http://cruisingoutpost.com/2013/05/sailboat-regattas-banned-lake-lowell-southern-idaho/
- May 13, 2013. Idaho Press-Tribune, "Civic agenda." http://www.idahopress.com/news/local/civic-agenda/article_dd30f57a-bb96-11e2-b842-001a4bcf887a.html
- May 13, 2013. Idaho Press-Tribune, "County to Deer Flat: We will use Lake Lowell as we wish." http://www.idahopress.com/news/local/government/county-to-deer-flat-we-will-use-lake-lowell-as/article_75c24c7c-bc13-11e2-98cb-0019bb2963f4.html
- May 14, 2013. Idaho Press-Tribune, "County rejects Deer Flat plan." http://www.idahopress.com/members/canyon-county-rejects-deer-flat-plan/article_6e6f1f9c-bc52-11e2-80eb-0019bb2963f4.html
- May 14, 2013. USA Today, State-by-State, "Idaho."

- May 15, 2013. Capital Press, "SW Idaho officials bristle at Lake Lowell limits." http://www.capitalpress.com/content/AP-lake-lowell-051513
- May 15, 2013. Idaho Press-Tribune, "Petition now available for Deer Flat plan." http://www.idahopress.com/petition-now-available-for-deer-flat-plan/article_05d6b298-bd2d-11e2-9f0c-001a4bcf887a.html
- May 15, 2013. Idaho Press-Tribune, "SW Idaho officials bristle at Lake Lowell limits." http://www.idahopress.com/news/state/sw-idaho-officials-bristle-at-lake-lowell-limits/article_05a0c57b-b053-5993-84f8-d20d32526d8d.html
- May 15, 2013. Idaho Statesman, "Water fight with feds brewing in Canyon County." http://idahostatesman.com/2013/05/15/2576383/water-fight-with-feds-brewing.html#storylink=misearch
- May 15, 2013. KTVB, "County commissioners take issue with Deer Flat management plan." http://www.ktvb.com/home/Deer-Flat-management-plan-could-restrict-activities-on-Lake-Lowell--207587611.html
- May 15, 2013. KUOW, EarthFix, "SW Idaho Officials Refuse To Enforce Lake Lowell limits." http://EarthFix.kuow.org/water/article/sw-idaho-officials-refuse-to-enforce-lake-lowell-l/
- May 15, 2013. Mountain West News, "USFWS plan for Idaho wildlife refuge sparks water fight with Canyon County." http://www.mountainwestnews.org/Index.aspx?recentEd=2873
- May 15, 2013. The Spokesman-Review, "Canyon commissioners threaten defiance over bird-protection rules on Lake Lowell." http://www.spokesman.com/blogs/boise/2013/may/15/canyon-commissioners-threaten-defiance-over-bird-protection-rules-lake-lowell/
- May 15, 2013. The Westerner, "Commissioners: Feds do not have authority over Lake Lowell." http://thewesterner.blogspot.com/2013/05/commissioners-feds-do-not-have.html
- May 16, 2013. Idaho Press-Tribune, Opinion, "Find way to continue sailing race at Lake Lowell." http://www.idahopress.com/members/find-way-to-continue-sailing-race-at-lake-lowell/article_b637cd54-bdc1-11e2-a401-0019bb2963f4.html
- May 16, 2013. Idaho Press-Tribune, Opinion, "No legitimate reason to cancel sail race." http://www.idahopress.com/members/no-legitimate-reason-to-cancel-sailboat-race/article_7f29c08c-bdc2-11e2-ab46-0019bb2963f4.html
- May 16, 2013. Idaho Press-Tribune, "Canyon County won't rule out Lake Lowell Lawsuit." http://www.idahopress.com/members/canyon-county-won-t-rule-out-lake-lowell-lawsuit/article_189b5cd0-bde1-11e2-ae58-0019bb2963f4.html
- May 16, 2013. Capital Press, "SW Idaho officials bristle at Lake Lowell limits." http://www.capitalpress.com/content/AP-lake-lowell-051513
- May 16, 2013. The Idaho Bass Federation, "The Idaho Bass Federation (TIBF) meeting Minutes, Thursday, May 16, 2013, 7:00pm." http://www.idahobassfed.com/maymin13.htm
- May 25, 2013. Idaho Press-Tribune, Opinion, "County says it will ignore Lake Lowell rules."
- June 4, 2013. Idaho Press-Tribune, Opinion, "Restrictions at Lake Lowell would be illogical." http://www.idahopress.com/members/restrictions-at-lake-lowell-would-be-illogical/article_bc20d5b4-ccab-11e2-8844-0019bb2963f4.html
- June 9, 2013. Idaho Press-Tribune, Opinion, "Canyon County commissioners take wrong approach on Lake Lowell." http://www.idahopress.com/members/canyon-county-commissioners-take-wrong-approach-on-lake-lowell/article_d4861bb4-cf08-11e2-b8ca-0019bb2963f4.html

H.1.3.7 Planning Updates

- July 15, 2010. Planning Update 1 was mailed to individuals on the CCP mailing list and adjacent landowners. Copies of the planning update were also available at the Visitor Center and made available at outreach events. Adjacent landowners in Malheur County were accidentally left off of the initial mailing. They received Planning Update 1 and Planning Update 2 in December. This planning update let the public know of the Refuge's intent to begin a planning process, provided an overview of the CCP process, and requested public comment.
- November 29, 2010. Planning Update 2 was mailed to individuals on the CCP mailing list. Adjacent landowners not on the mailing list received postcards informing them of the availability of the planning update on the Refuge's website. Copies of the planning update were also available at the Visitor Center and outreach events. This planning update provided an overview of comments received during the summer scoping period.
- May 27, 2011. Planning Update 3 was mailed to individuals on the CCP mailing list. Adjacent landowners not on the mailing list received postcards informing them of the availability of the planning update on the Refuge's website. Copies of the planning update were also available at the Visitor Center and outreach events. This planning update provided an overview of preliminary draft alternatives and requested public comment.
- October 25, 2011. Planning Update 4 was mailed to individuals on the CCP mailing list. Adjacent landowners not on the mailing list received postcards informing them of the availability of the planning update on the Refuge's website. Copies of the planning update were also available at the Visitor Center and outreach events. This planning update provided an overview of comments received after the release of the preliminary draft alternatives and explained some of the changes that would be made based on those comments.
- March 15, 2013. Planning Update 5 was mailed to individuals on the CCP mailing list. Adjacent landowners not on the mailing list received postcards informing them of the availability of the planning update on the Refuge's website. Copies of the planning update were also available at the Visitor Center and outreach events. This planning update presented a summary of the alternatives proposed in the Draft CCP/EIS and requested public comment.

H.1.3.8 Other Tools

- The Refuge website featured CCP information, Refuge fact sheets, frequently asked questions, and comment forms.
- CCP information flyers and outreach "business cards" were placed in over 40 local businesses.
- CCP informational "half sheets" and/or outreach "business cards" were handed out at every presentation and outreach event and were passed out during field outreach.
- Refuge and CCP fact sheets were created and made available at presentations and outreach events, and in the Visitor Center.
- The Refuge created CCP messages that played on the Headquarters/Visitor Center phone lines if someone was put on hold or called after business hours.
- Participated in Senator Crapo's press conference at the Lower Dam Recreation Area on August 14, 2010.
- Article in the Southwest Idaho Birders Association July newsletter
- Article in the Idaho Bass Federation Nation spring newsletter

- Article in the Deer Flat NWR Volunteer newsletter
- Draft CCP video PowerPoint posted on Refuge website
- Spanish language translation of Planning Updates #3 (preliminary alternatives) and #5 (Draft CCP/EIS) posted on Refuge website

H.1.3.9 Federal Register Notices

- July 15, 2010. Federal Register published notice of intent to prepare a CCP/EIS and a request for comments.
- March 15, 2013. Federal Register published notice of action to release Draft CCP/EIS and make it available for public comment.

H.1.3.10 Field Reviews

- June 16-19, 2008. Wildlife and Habitat Management Field Review on Refuge. Approximately 30 participants.
- September 9-11, 2008. Public Uses Field Review on Refuge. Approximately 25 participants.

H.2 Response to Comments

During the 60-day comment period for the Draft CCP/EIS for Deer Flat NWR, we received comments from 170 entities or individuals as well as one petition signed by 426 people. All written comments were reviewed and organized so that an objective analysis, summary, and presentation of the comments could be made.

This appendix contains a summary of all comments that were received in response to the Draft CCP/EIS during the official public comment period. Due to public interest, comments on the draft were accepted from March 15, 2013, to May 15, 2013, longer than the required 45-day comment period.

Each original piece of correspondence was assigned an identification number and identified with the last name and first initial of the commenter. Note that for simplicity's sake, the word "letter" is generally used throughout this appendix to refer to any comment or reference document received, whether by letter, fax, email, or other form.

Some individual commenters mailed a number of letters and/or reference materials. Multiple correspondences from a commenter are counted as one comment letter. Telephone calls from the public were also received. All callers were encouraged to place their comments in writing so they could be included in the public record.

A database was created to log correspondence from each of the commenters, and letters were placed in one file. To help analyze the nature and extent of comments received, a number of themes and subthemes were identified within the letters. Comments were coded manually and electronically within the identified themes.

Comments were grouped into 21 categories based upon management actions considered in the Draft CCP/EIS alternatives or based on topics of particular interest as indicated by comments themselves. These categories are: CCP/EIS process, purpose of Lake Lowell, water rights, wildlife and habitat

management, trapping, water quality, public use management—general, facilities, refuge access, hunting, fishing, wildlife observation and photography, environmental education and interpretation, partnerships, nonwildlife-dependent recreation, boating—general, boating—closures, boating—no-wake zones, economic effects, hydropower facility, and editorial comments.

Due to the volume and similarity of written comments received, most comments have been paraphrased from the originals, and in some cases consolidated with others where the Service's response is the same. In some cases we have included specific language from a letter that best summarized similarly written comments.

We received comments both in opposition to and in support of each alternative. Where the comment provided some level of detail or was based on a real or perceived fact, the Service has provided a response. Where the comment expressed solely an opinion and was not supported by any assertion, the Service considered the comment in selection of the Preferred Alternative, but did not respond to the comment in this appendix, other than to thank the writers for expressing their opinions and thoughts.

H.2.1 Changes Made to the Final CCP

Table H-1 shows the major changes between the Draft and Final CCP. For additional information, see Chapter 2 and Maps 4-9 in the CCP/EIS.

Table H-1. Summary of Changes to Alternative 2 between the Draft and Final CCP/EIS.

Theme	Alternative 2 Draft CCP/EIS	Alternative 2 Final CCP/EIS
Public Use		
Youth Waterfowl Hunt	Open only southeast of Parking Lot 1.	Open in all designated waterfowl hunt zones, not in area southeast of Parking Lot 1.
Ice fishing	Not allowed.	Allowed in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by the Bureau of Reclamation (see Map 5).
Walking with on-leash dogs	Allowed on designated trails.	Allowed on designated trails and at LDRA.
Jogging, Bicycling, and Horseback Riding	Groups of more than 4 people would need to obtain a SUP. Groups larger than 10 people would be prohibited.	Groups with 10 or fewer people would not require a SUP. Groups of more than 10 people would be required to obtain a SUP.
Trapping	Not included in Draft CCP/EIS	Trapping would not be allowed on the Lake Lowell Unit. Trappers would be allowed to use the Snake River Islands to access trapping sites below high water that are under the State's jurisdiction. The use of licensed trappers for predator management under the provisions of 50 CFR 31.16, would be considered if it is identified as a management need.
Sailing Regattas	Not allowed at Lake Lowell Unit.	Allow at Lake Lowell Unit according to stipulations in Compatibility Determination, including regattas allowed only every other week in April and May and stipulations to ensure that presence of regatta does not restrict the ability of other users to use the Refuge.
Swimming	Allowed only in two designated areas.	Encouraged in two designated areas, but allowed elsewhere, with the exception of around fishing or other wildlife-dependent facilities (e.g., docks), or immediately adjacent to boat launch areas.
Nonwildlife-dependent	Allowed at Lower Dam Recreation Area	Allowed only at LDRA. Stipulations laid out in the Swimming, Beach Use, and Picnicking Compatibility Determination (see

Theme	Alternative 2 Draft CCP/EIS	Alternative 2 Final CCP/EIS
Organized Group Activities	(LDRA) only, and by special use permit (SUP).	Appendix B). If staffing and funding levels allow at a later time, events may be required to obtain an SUP and a fee may be assessed for the SUP.
Clarifying edits	Throughout the document.	Edits were incorporated to improve the clarity and accuracy of the document.

H.2.2 Summary of Comments Received

This section provides a summary of the individual comments received on the Draft CCP/EIS followed by the Service's responses to those comments. The comments are organized into 21 categories based on management actions considered in the Draft CCP/EIS alternatives or based on topics of particular interest as indicated by comments themselves.

H.2.2.1 CCP/EIS Process

1. **Comment summary:** Expressed opinions supporting or opposing each of the alternatives. Some preferred Alternative 1 since it meant no changes would occur in the current management. Others agreed with our Preferred Alternative, believing that it provided a balanced approach to recreation and wildlife management. Others preferred Alternatives 3 or 4 because they provide better protections for wildlife and habitat as well as wildlife-dependent recreationists.

   Response: The Service acknowledges and appreciates these comments.

2. **Comment summary:** Expressed concern that management actions are required only if there is proof that a problem exists and stated that there are no studies, data, or evidence that wildlife are being negatively impacted by recreational activities on Lake Lowell. Suggested that wildlife have been coexisting with multiple uses and there is no reason to change current management.

   Response: As discussed in Section 1.4, the Service undertook a comprehensive conservation planning process for the Refuge because the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee, et seq.), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), requires refuge CCPs to set forth management guidance for a refuge for a period of 15 years.

   In developing a CCP, Refuge policy requires that best available science be used. Studies need not have been conducted on the particular Refuge. Many studies have shown that human-caused disturbance can be detrimental to wildlife as cited throughout the document, especially in Chapter 2 and Appendix B. The most relevant studies were used to assess the effects of recreational activities on wildlife before proposing management strategies. Rationales for these strategies are in Section 2.4.

   Deer Flat National Wildlife Refuge was established primarily for the protection of migratory birds and other wildlife (see Section 1.7.2). As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the "fundamental mission" of the National Wildlife Refuge System "is wildlife conservation: wildlife and wildlife conservation must come first." The Refuge Administration Act also identifies six priority

wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on refuges, where compatible with the wildlife and wildlife habitat mission. Finally, other activities can be allowed if deemed appropriate (see Appendix A) and if they can be implemented without impairing existing or future wildlife-dependent uses. Therefore, where conflicts arise between protections for wildlife and habitat and recreational activities, priority must be given to wildlife and habitat.

H.2.2.2 Purpose of Lake Lowell

3. **Comment summary:** Suggestions that the infrastructure and water in Lake Lowell were built and owned through tax dollars for local use. Concerns of ownership of the water and the management of the established reservoir and the regulations imposed by executive order are in need of justification.

   Response: The Service recognizes that the Refuge is an overlay refuge on a Reclamation reservoir, and Reclamation has primary jurisdiction over the manipulation of water levels of Lake Lowell. The Board of Control has the day-to-day responsibility of controlling Lake Lowell water levels. The executive order that established Deer Flat NWR states the Refuge does not have the legal authority to manipulate water levels. The Service also recognizes that refuge operations are secondary to operations and maintenance of the irrigation project.

   Under the Refuge Administration Act, each refuge must be managed to fulfill the Refuge System mission as well as the specific purposes for which it was established. The Refuge was established to provide refuge and breeding grounds for migratory birds and other wildlife, subject to use by the Department of Interior for reclamation work originally as E.O. 1032, and re-established and renamed in 1937 under E.O. 7655. This means that the Service has an obligation to manage uses of the Refuge consistent with the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-668ee, et seq.) and other laws, regulations, and policies governing the Refuge System, but our management may not interfere with operation of the reservoir for irrigation purposes. For more information on Refuge history, see Appendix I.

4. **Comment summary:** Lake Lowell and surrounding resources should continue to be managed by state and local governments such as Idaho Department of Fish and Game and Canyon County.

   Response: Deer Flat National Wildlife Refuge was designated in February 1909, just three days after water started flowing in the New York Canal to fill the reservoir. Although there was no on-site Refuge staff until 1937, the Refuge has been managed by the Fish and Wildlife Service since 1909. The Service appreciates ongoing partnerships with Canyon County and IDFG to facilitate law enforcement, maintenance, and fish and wildlife management. The Service looks forward to continuing coordination and partnerships with both Canyon County and IDFG.

   As a result of a pre-planning task prior to initiation of the CCP process, the Service and Reclamation concluded that the Service has jurisdiction over surface water and public

uses on Lake Lowell. Now, because it has been determined that the Service has responsibility for the management of all public uses within the Refuge, including on-water recreational uses, these uses must be legally compatible with the purposes of the Refuge. For more information on Service policy and mandates, see Section 1.6.3.

H.1.2.3 Water Rights

5. **Comment summary:** The Board of Control's water conservation projects should not be viewed by the Service as a source of water for the Service's programs. The water managed by the Board of Control is dedicated by law to its landowners.

   Response: The Service recognizes that it does not possess a water right for the water within Lake Lowell.

6. **Comment summary:** "The Board of Control welcomes partnerships and collaboration in order to protect and enhance wildlife habitat protection in Idaho. However, the Project cannot enter into any agreements that would 1) prevent or restrict it from providing irrigation water to its Districts for distribution the Districts'' landowners, or that would 2) prevent or restrict the Board of Control from conducting maintenance and cleaning operations, or that would 3) prevent or restrict the Board of Control from taking emergency action to prevent or minimize damage from flooding events…. Given the uncertain nature of water availability the Board of Control cannot commit to maintain any particular reservoir elevation for non-irrigation purposes, including for the Service."

   Response: The Refuge understands the irrigation purpose of Lake Lowell and that administrative responsibility for water level management lies with Reclamation and the Board of Control. The Refuge also appreciates the Board of Control's invitation to continue to explore a partnership to maintain a water level appropriate to provide nesting and foraging habitat for grebes, fish, and other wildlife from April through July, while still meeting the Board of Control's mission of providing water to irrigators. Further discussions between parties would be needed to assist each other's established purpose and mission.

H.1.2.4 Wildlife and Habitat Management

7. **Comment summary:** Pointing to a provision respecting state authority contained in the National Wildlife Refuge System Administration Act (NWRSAA or Act), as amended, the Idaho Department of Fish and Game (IDFG) states that management of resident fish and wildlife on refuge lands is under the State of Idaho's jurisdiction, including the stocking of resident fish species in Lake Lowell. IDFG states that it looks forward to working with the Service to develop a fisheries management plan, but that any language limiting IDFG's ability to manage the fisheries is unacceptable.

   Response: All uses of national wildlife refuges are subject to the provisions of the NWRSAA. The Secretary is authorized, "under such regulations as he may prescribe," to "permit the use of any area within the System for any purpose … whenever he determines that such uses are compatible with the major purposes for which such areas were established …" (16 U.S.C. § 668dd(d)(1)(A)); see also id. § 668dd(d)(3)(A) [The

Secretary shall not permit a use of a refuge "unless the Secretary has determined that the use is a compatible use"]).

The provision cited by IDFG states:

> Nothing in the Act shall be construed as affecting the authority, jurisdiction, or responsibility of the several States to manage, control, or regulate fish and resident wildlife under State law or regulations in any area within the System. Regulations permitting hunting or fishing of fish and resident wildlife within the System shall be, to the extent practicable, consistent with State fish and wildlife laws, regulations, and management plans. (Id. § 668dd(m)

The United States Courts of Appeals for both the Ninth and Tenth Circuits have found that Congress invoked its power under the Property Clause of the Constitution when it enacted the NWRSAA, and that the Act plainly gives the Service the authority to manage national wildlife refuges (Nat'l Audubon Soc'y v. Davis, 307 F.3d 835, 854 [9th Cir. 2002]; Wyoming v. United States, 279 F.3d 1214, 1228 [10th Cir. 2002]). Further, both Federal circuits held that the provision cited by IDFG was not meant to eviscerate Federal authority over refuge management. Rather, they concluded that it reflects Congress's intent for ordinary principles of conflict preemption to apply. This means to the extent that actual conflict persists between State and Federal policies, State law is pre-empted by the NWRSAA (307 F.3d at 854; 279 F.3d at 1234).

Nevertheless, we have a clear responsibility, not only pursuant to the Section 668dd(m) but other provisions of the NWRSAA and our own policies, to coordinate and cooperate with IDFG in administering Deer Flat NWR. We look forward to working with IDFG in this effort.

Regulations implementing the NWRSAA are found in the Code of Federal Regulations at 50 C.F.R. Subchapter C. Policies implementing the NWRSAA specific to hunting and fishing are found in the U.S. Fish and Wildlife Service Manual at 605 FW 2 and 605 FW 3, respectively. The policy on coordination and cooperative work with State fish and wildlife agencies is found at 601 FW 7. In addition, the Compatibility Policy, which regulates uses on national wildlife refuges in collaboration with the purposes of the NWRSAA can be found in 65 Federal Register 62458-62483 (Oct. 18, 2000). We will do everything we can to accommodate IDFG's proposals consistent with applicable Federal laws and our regulations and policies.

8. **Comment summary:** The Boise Project Board of Control (BPBOC) states that it has authority to remove vegetation on the banks of Lake Lowell as part of its operation and maintenance duties because these trees and brush consume water that belongs to the irrigation districts' landowners and the Federal government does not have water right for aesthetic, wildlife or recreation purposes. BPBOC states that it will continue to carry out that function in the vicinity of the conduit and irrigation works and that the alternative chosen by the Service must recognize the primary authority of the BPBOC to carry out its irrigation and maintenance functions even when those functions might conflict with the goals of the Service.

Response: We agree that refuge operations are secondary to operation and maintenance (O&M) of the irrigation project, including control of vegetation where, for example, Reclamation finds that it is unreasonably interfering with canal bank stability or necessary access. Accordingly, nothing in the CCP is intended to interfere with O&M of the irrigation project. However, we understand BPBOC's comment to extend beyond normal O&M activities to removal of vegetation from the reservoir shoreline based on ownership of the water rights. The trees and shrubs growing along the margins of Lake Lowell are a function of the way the reservoir water levels are managed by Reclamation and BPBOC, a situation unrelated to the ownership of water rights. In addition, the comment does not cite any legal authority for this assertion and we are not aware of any. Taken to its logical conclusion, it would mean that downstream water right owners throughout the State of Idaho could remove vegetation on upstream property simply because it might use water. Therefore, unless Reclamation determines that it is necessary for O&M of the irrigation project, removal of vegetation along the reservoir shoreline would be governed by refuge regulations.

9. **Comment summary:** Expressed concern that providing further protection for waterbirds may increase their population and thus negatively impact fish populations at Lake Lowell.

   Response: Deer Flat National Wildlife Refuge was established as a refuge and breeding grounds for migratory birds and other wildlife. Protection of migratory birds takes priority over protection of non-native fish. The Service looks forward to working with IDFG to manage fish populations in order to continue to provide a high-quality fishing experience.

10. **Comment summary**: Referenced studies that showed that water level fluctuations and water quality problems (especially nutrient loads) were the main concerns for nesting grebes in Idaho and that those problems should be addressed first.

    Response: The Service looks forward to working with partners to improve Lake Lowell water quality, and the CCP includes a number of strategies to improve water quality (summarized in Section 2.3.1). Board of Control, in cooperation with Reclamation, manages the water level. The CCP includes a proposal for the Service to consult and collaborate with Board of Control and Reclamation to explore the possibility of maintaining a water level appropriate to provide nesting and foraging habitat for grebes, fish, and other wildlife from April through July, while still meeting the Board of Control's mission of providing water to irrigators (see Section 2.3.1).

11. **Comment summary:** Commenter recalls the Refuge controlling the carp population by allowing carp to be harvested commercially.

    Response: Carp removal has occurred intermittently through a Special Use Permit (SUP) for many years to enhance submergent vegetation and moist-soil plants in Lake Lowell. A commercial fisherman currently uses a beach seine to harvest carp. Current seining operations, which remove an estimated 50 to 125 tons of biomass annually, likely do not remove enough of the carp population (estimated at 4,800 tons of biomass) to result in significant water quality improvements or promote submergent plant growth.

The Refuge looks forward to working with IDFG and other partners to develop and implement methods to reduce carp biomass in Lake Lowell. Potential methods include mechanical removal, chemical treatments, biological treatments, and carp exclusion devices. Carp impacts and potential treatments are further discussed in Wildlife and Habitat Objective 1.1 in Section 2.4.1.

12. **Comment summary:** Proposed stocking sunfish to enhance prey base for piscivorous birds and for anglers at Lake Lowell. Expressed concern that non-native fish not be stocked unless they have become an important food source for wildlife.

    Response: The Refuge is committed to developing a cooperative agreement with the State of Idaho for resident fish and wildlife management. The Refuge would continue to coordinate with IDFG on the stocking of fish species identified in Objective 3.1 of Section 2.5.3. Stocking of any other fish species would require additional planning. The Refuge plans to work in close cooperation and coordination with IDFG for management of fishing opportunities on the Refuge and in setting population management goals and objectives. These strategies will most likely benefit piscivorous birds as well as increase fishing opportunities.

13. **Comment summary**: Expressed concern about Refuge management of invasive weeds, including that the Service has not done an effective job of treating invasive species, that all invasives should be aggressively treated, perhaps in partnership with Canyon County Weed Control, that the CCP/EIS should include specific actions to control invasive species including implementation schedules, and that the Service should minimize the use of herbicides and explore alternative methods like the use of goats.

    Response: The Service is aware of the major problems that invasive species and noxious weeds present on all public lands, including the Refuge, and invasive species control is a priority for the Refuge to address. As noted in Section 2.3.1, the Service would use an Integrated Pest Management (IPM) plan (see Appendix G) to identify weed control methods based upon effectiveness, cost, and minimal ecological disruption (which considers minimum potential effects to nontarget species and the Refuge environment). The Service is currently, and will continue, working with various Federal, State, and local agencies to implement invasive species control. Appendix C identifies that a habitat management step-down plan will be developed within 2 years of CCP implementation. The habitat management plan would identify specific areas that need to be prioritized for treatment, as well as integrated pest management strategies to be used.

14. **Comment summary:** Expressed concern about the existence of brush piles and suggested that volunteers be recruited to remove them for fire safety.

    Response: Section 2.4 identifies that issuance of firewood collection permits could be used to help manage fuel loads in riparian areas by removing some of the dead and downed debris. It could also be used to clear mudflat habitat for migrating shorebirds.

15. **Comment summary:** Expressed concern about predator management on the Refuge and asked that the Service reduce the number of crows, magpies, starlings, and other predators.

Response: As expressed in Section 2.3.1, the Refuge is concerned about controlling invasive species because of their effects on native species and habitat. The Service would continue to work with our State and local partners to control the impacts of non-native animals (e.g., starlings, bullfrogs, house cats, etc.). While the Refuge purpose is to protect migratory birds, the Service will continue to work with our State and local partners to identify and mitigate impacts of native species (e.g., crows and magpies) that present a management concern.

16. **Comment summary:** Expressed concern about the amount of tree removal proposed in Objective 1.3 and suggested that a balance between the needs of fish/fishermen and shorebirds should be considered.

    Response: Tree removal is proposed in an area near Farm Field 5 that was historically kept open to provide duck trapping sites and is currently within a closed section of the Refuge. Because of the topography of the area and the narrow vegetation line, these spots are used by migrating shorebirds even when the water level is high. The Service proposes to continue to remove trees from approximately 25 acres of sparsely vegetated riparian zone to keep these areas free from vegetation. There is an estimated 760 acres of riparian habitat on the Lake Lowell Unit, and impacts to fish and fishermen from this action are not anticipated.

H.1.2.5 Trapping

17. **Comment summary:** The Idaho Trappers Association suggested that trapping is a valuable tool for controlling furbearers during nesting season and that the Service should open the Refuge to licensed trappers. Also suggested different strategies and dates that would allow public commercial trapping in order to benefit waterfowl on the Snake River Islands.

    Response: The Service recognizes that trapping is a valuable tool that land managers use for wildlife management purposes. However, trapping on the Refuge would not be safe because of concerns about injury to domestic pets as well as Refuge visitors.

    The Snake River Islands Unit would continue to be open to public access from June 15 to January 31 on goose-nesting islands and from July 1 to January 31 on heron- and gull-nesting islands. Trappers may use the islands during those months to access trapping sites below high water that are under the jurisdiction of the State of Idaho. Should the Service determine that predators are negatively impacting waterfowl nesting on the Snake River Islands Unit, we will consider all management options to remedy the situation, including the use of licensed fur trappers.

18. **Comment summary:** The Idaho Trappers Association pointed out that the Refuge does not have to determine “appropriateness” of trapping because the form for “Finding of Appropriateness of a Refuge Use” (form 3-2319) states “This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997” and trapping by licensed fur trappers would clearly fall under the category of “take regulated by the State,” and could therefore be found to be an appropriate activity on the Refuge.

Response: Trapping is not a Refuge use that needs to be evaluated under the Service's Appropriate Use Policy. We have considered the opportunity to allow a commercial/recreational trapping program on the Refuge and have concluded that this use would not be safe.

Public commercial/recreational trapping on the Refuge, especially the Lake Lowell Unit, has a high likelihood of capturing and causing injury to nontarget wildlife and domestic pets. Visitors who are unfamiliar with trapping procedures could further injure their pets or themselves by trying to free a captured pet or wildlife.

The limited space and high urban use of this Refuge is not conducive to a public trapping program as the potential for conflict between trapping and recreation visitors would be high. Given the potential for disturbance to wildlife-dependent uses and wildlife, this use is not consistent with the purpose of the Refuge or its visitor use goals. The Snake River Islands would continue to be open to public access from June 15 to January 31 on goose-nesting islands and from July 1 to January 31 on heron- and gull-nesting islands. Trappers may use the islands to access trapping sites below high water that are under the jurisdiction of the State of Idaho.

19. **Comment summary:** The Idaho Trappers Association cautioned that relocating furbearing animals is not recommended from a biological standpoint and that "the American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose relocation of mammals because of the risk of disease transmission, especially amongst raccoons, skunks, and foxes."

    Response: The Service has not proposed in the CCP/EIS to conduct any relocation of furbearing animals.

H.1.2.6 Water Quality

20. **Comment summary:** The Boise Project "believes that a water quality improvement feasibility study was encompassed in the Lake Lowell Addendum to the Lower Boise TMDL and this objective oversteps the authority of The Service."

    Response: The Federal Clean Water Act (CWA; 33 U.S.C. 1251 et seq.) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water-quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water-quality standards). Lake Lowell is on this list. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants that is set at a level expected to achieve water quality standards. The Idaho Department of Environmental Quality (IDEQ) published the final TMDL for pollutants in Lake Lowell in 2010.

    Although water quality issues are not within the management authority of the Refuge, contaminants in Lake Lowell may have an impact on wildlife resources and recreational

opportunities at the Refuge. Before assessing ways to reduce contaminants, we must first identify and quantify their presence, and assess their impacts on the public and wildlife. Once there is a better understanding of the contaminants issue, the Refuge would be able to work with partners to address potential problems and look for solutions.

21. **Comment summary:** The U.S. EPA expressed appreciation of the Service responsiveness to scoping comments and support of Service strategies outlined in Section 2.3 for addressing water quality. They recommend that the Service prioritize carp population reductions and reduce sediment runoff for improved canal maintenance.

    Response: Carp impacts and potential treatments are further discussed in Wildlife and Habitat Objective 1.1 of Section 2.4.1, and in a previous comment relating to carp commercially harvested from Lake Lowell.

22. **Comment summary:** The Board of Control identifies that they use best management practices (BMPs) to address siltation and water quality issues and strives to continually improve as more information is learned and new technologies become available. The Board of Control doubts that the Service has greater knowledge and judgment concerning what constitutes the best management practices where irrigation operations and delivery are concerned. The Board of Control also feels the Service has attempted to impede regular maintenance functions on drains leading to Lake Lowell. This interference is inappropriate and oversteps the Service's authorities.

    Response: The Service agrees that the Board of Control may have more knowledge and judgment where maintenance of irrigation operations and delivery are concerned. The Refuge would like to establish a partnership and coordinate with the Board of Control and Reclamation as stated earlier to "identify ways to reduce future siltation and correct current siltation issues without damaging wildlife habitat or impeding the delivery of irrigation water." The Refuge is also cognizant of Board of Control's responsibility of maintenance of irrigation operations and delivery. The Board of Control did not provide any specifics and the Refuge is not aware of any interference to impede the irrigation purpose or administrative responsibility for water level management with Reclamation and the Board of Control. The Refuge remains very concerned about water quality impacts on both wildlife and Refuge visitors and plans to be an active partner in working toward improving the water quality of the lake.

H.1.2.7 Public Use Management—General

23. **Comment summary:** Several specific strategies were suggested for implementing proposed actions. For example: providing restrooms on the south side of Lake Lowell, providing additional trash receptacles at access points, providing summer camps on a variety of suggested topics, providing binocular and camera rentals, expanding the book store in the Visitor Center, conducting more outreach to inform the public that Lake Lowell is part of the Refuge, and constructing an outdoor amphitheater for educational programs.

    Response: The purpose of the CCP is to provide overall long-term management direction, and includes strategies to improve visitors' experience, including a strategy to "Provide additional bathroom facilities at high-use access points" (Section 2.5.1,

Objective 1.1). Specific management decisions about recommended strategies will be developed as part of the Visitor Services step-down plan, which is planned to be completed within 5 years of CCP implementation and will include public input. The Service acknowledges these comments and will incorporate them as appropriate into the Visitor Services step-down plan.

24. **Comment summary:** Proposal to eliminate some or all wildlife-dependent recreational activities (including elimination of all hunting or specifically youth hunting) or expressed support for wildlife-dependent recreational activities.

    Response: As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the "fundamental mission" of the National Wildlife Refuge System "is wildlife conservation: wildlife and wildlife conservation must come first." The Refuge Administration Act also identifies six priority wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on refuges, where compatible. All of the six priority wildlife-dependent recreational activities have been determined to be compatible and would therefore continue to be allowed according to the stipulations laid out in the compatibility determinations in Appendix B.

25. **Comment summary:** Proposal to more clearly mark and improve signage on multi-use trails and to provide better directional signage off-Refuge to help people find the Refuge.

    Response: As noted in Objective 1.1 of Section 2.5.1, to better welcome and orient visitors, the CCP includes strategies to install entrance signs at high-use visitor access points and along high-traffic roads bordering the Refuge, to install orientation signs that alert visitors to the presence of nearby Refuge facilities (e.g., "boat launch," "fishing area," "Visitor Center") on main roads in appropriate locations, and to provide trail signs at all trailheads.

H.1.2.8 Facilities

26. **Comment summary:** Expressed concern about the need to provide additional visitor facilities as well as support for providing additional proposed recreational facilities described in the Preferred Alternative, including providing more ADA-accessible trails, wildlife observation and photography facilities, docks, and disabled access for all activities.

    Response: The selected alternative includes all of the facilities proposed by these commenters. Providing a variety of recreational opportunities and facilities provides multiple points of entry for visitors of different comfort and skill levels.

    Installation of the proposed facilities does depend on funding. Funding would be sought through increases in Refuge base funding, special project funds, grants, and the like. See Appendix C for additional implementation information.

27. **Comment summary:** Request that access roads be paved or oiled and that more parking be provided.

Response: The Refuge would consider upgrading, expanding, or providing additional access points as funds for road improvements and maintenance become available. Consideration of factors such as the effects on runoff and erosion, on wildlife habitat, and on existing wildlife-dependent recreational opportunities would be assessed while developing a Visitor Services step-down plan. A Visitor Services Plan is planned to be completed within 5 years of CCP implementation and will include public input. The Service acknowledges these comments and will incorporate them as appropriate into the Visitor Services step-down plan.

28. **Comment summary:** Proposal to provide additional facilities on the south side of Lake Lowell within areas that are inundated during high water, including providing duck blinds and providing a trail between Parking Lot 1 and Parking Lot 7.

    Response: Given the fluctuating water levels of Lake Lowell, facilities installed on land below the high water level of the lake require either high expense or management challenges. For example, the proposal to install duck blinds was considered; however it was determined to not be practical to install blinds that would be useful to duck hunters, given that water levels fluctuate from year to year and even during waterfowl hunting season. The proposal to install a trail on the south side below high water was also considered, and is included in Alternative 3. However, the expense of building a boardwalk to remain accessible during all water levels, nearly six million dollars, was determined to be too high.

29. **Comment summary:** Support for a walking and bicycling path around the entire lake.

    Response: As noted in Section 2.2, this idea was considered but rejected, because it would remove habitat and increase disturbance to wildlife and wildlife-dependent recreationists. In addition, the existence of wildlife closure areas on the Refuge would make it impossible to have a bike loop around the entire lake. This proposal may be best explored by other entities as an easement on land adjacent to the Refuge. The Refuge would be happy to discuss connecting existing or proposed new Refuge trails with a trail system installed adjacent to the Refuge by other agencies.

30. **Comment summary:** The College of Idaho Museum of Natural History proposed installing research stations.

    Response: The Refuge looks forward to working with the College of Idaho Museum of Natural History to better understand their proposal and identify how the Refuge and Museum can mutually benefit from potential research stations.

H.1.2.9 Refuge Access

31. **Comment summary:** Expressed concern that providing access to the Refuge only through designated entrances would alienate law-abiding users who would like to use the most convenient point to gain access and create a labor-intensive enforcement challenge and therefore requested that visitors continue to be able to access the Refuge over fences adjacent to private property and over fences along roadways, including between the Tio Lane and Gotts Point entrances and off of Lakeshore Drive.

Response: As noted in Objective 1.1 of Section 2.5.1, the Preferred Alternative would provide access to the Refuge through designated entrances only. Refuge visitors can currently access recreational activities adjacent to 17 designated entrances scattered around the Lake Lowell Unit, and the infrastructure associated with each access reduces habitat availability as well as recreational opportunities. By restricting access through designated entrances only, those users who are interested in enjoying areas farther away from crowds (e.g., the area between the Tio Lane and Gotts Point entrances) have the ability to do that by walking farther from the designated entrances. Finally, continuing to allow access to the Refuge over fences could result in an increase in habitat impacts (through increased social trailing and spread of invasive plant seeds) and wildlife disturbance, especially given anticipated increased development over the next 15 years that could increase demand for this sort of access from private lands.

32. **Comment summary:** Request for a new designated entrance between the Tio Lane and Gotts Point entrances.

    Response: As noted in Objective 1.1 of Section 2.5.1, the Preferred Alternative would provide access to the Refuge through designated entrances only. The Service considered but rejected providing another Refuge access in this area. Visitors can currently access duck hunting opportunities through a short walk east of the Gotts Point entrance in the East Side Recreation Area and at several locations in the South Side Recreation Area. Because these areas are a short distance from designated entrances, they can become crowded. Currently, visitors who are interested in enjoying areas farther away from crowds have the ability to do that by walking farther from the designated entrances. Designating another entrance in this area would reduce the variety of duck hunting experiences available on the Refuge.

33. **Comment summary:** Request for the Refuge to work with private landowners along Lake Shore Drive to develop an agreement whereby they provide access across their property to a proposed new entrance and trail to access the East Dike Trail and the Tio Lane parking lot from the southeast Refuge boundary.

    Response: Refuge visitors can currently access recreational activities adjacent to 17 designated entrances at the Lake Lowell Unit, and the infrastructure associated with each access reduces habitat availability as well as recreational opportunities. Although an additional designated entrance might be considered, the Service considers the financial and habitat impacts of the access proposed by the commenter would be unwarranted given the availability of access to the same area (Leavitt Tract and East Dike Trail) through an existing entrance that is less than a 3 mile drive away.

34. **Comment summary:** Proposal to close “as much land as possible to overland vehicles such as ATVs with the exception of research vehicles.”

    Response: The Refuge does not currently allow vehicles, including ATVs, to travel off of designated roads, and no change is proposed in the CCP/EIS to this policy.

35. **Comment summary:** Interest in re-opening Gotts Point to vehicles to increase access to the area, while a separate comment encourages the closure and validates the desired

results of the area being safe and enjoyed by families while enjoying water-related activities.

Response: Gotts Point is currently open to public access from February 1 to September 30. The road to the point has been closed to reduce illegal activities and vandalism. The Service proposes to re-open the road to Gotts Point (Objective 3.1 in Section 2.5.3) upon completion of a memorandum of understanding or cooperative agreement with Canyon County to resolve law-enforcement issues and retain the family-friendly nature of the area. Providing vehicle access to Gotts Point will provide more opportunities for both wildlife-dependent and nonwildlife-dependent recreational opportunities.

36. **Comment summary:** Request that the gate at Gotts Point be relocated 150 yards farther west "to provide a gear drop off area for uses that require substantial equipment."

Response: As described above, the Service plans to re-open the road to Gotts Point when a law-enforcement agreement is in place. Given that the current Gotts Point parking lot allows access to all recreational opportunities in that area (e.g., lakeshore, trails), the Service considers that the investment of financial and staff resources in moving the gate a short distance would be unwarranted.

37. **Comment summary:** Expressed support for fees if used to support funding of fee-payer activities or if recreational access to the Refuge is left unchanged, and expressed opposition to charging fees to access public lands.

Response: Section 2.3.2 proposes that a feasibility assessment be conducted to evaluate whether to charge an entrance and/or boat launch fee to provide funding to maintain visitor facilities and hire visitor services and law enforcement staff. Determining whether a fee would be implemented will be based on the feasibility assessment and appropriate public input.

H.1.2.10 Hunting

38. **Comment summary:** IDFG requested that fall turkey hunting be allowed on the Snake River Islands Unit because they anticipate a growing turkey population and would like to be able to use hunting as a management tool.

Response: As noted in Section 2.3.2, opportunities for hunting of additional species (e.g., turkey) would be addressed in future step-down planning efforts occurring in close coordination with IDFG. Opening a new turkey hunt would require both a hunt plan and an individual National Environmental Policy Act (NEPA) analysis. This process would require additional information and analysis before a decision could be made. The Service looks forward to working with IDFG to evaluate the possibility of opening a turkey hunt on the islands.

39. **Comment summary:** Expression of opposition to the proposed shotgun shell limit for waterfowl hunters on the Lake Lowell Unit as well as support for the limit because it potentially allows more people the opportunity to hunt and makes hunters more ethical by encouraging them to wait for birds to come within range before shooting.

Response: As noted in Objective 2.1 of Section 2.5.1, limiting waterfowl hunters to possession of 25 shotgun shells per hunter per day would help address complaints about sky busting.

40. **Comment summary:** Requests to modify designated hunting areas to either close to hunting those lands with the most biodiversity of plants and animals and also to open the area east of Parking Lot 1 to hunting.

    Response: Existing hunting areas were assessed to determine whether they are appropriate, based on concerns that high-quality habitat be protected as a refuge from hunting and that other wildlife-dependent recreationists have access to areas without hunting. Through this assessment, it was determined that existing designated hunting areas are appropriate. The area east of Parking Lot 1 is particularly high-quality habitat for waterfowl and other waterbirds and therefore would not be opened to hunting.

41. **Comment summary:** IDFG pointed out that it was unclear whether the youth waterfowl hunt area proposed east of Parking Lot 1 in alternatives 2 and 4 would allow hunting only during the designated youth waterfowl hunt dates set by the Fish and Game Commission or whether youth-only hunting would be allowed in that area during the rest of the hunting season as well.

    Response: After clarifying discussions with IDFG to indicate the Refuge's intent to limit hunting during the designated youth waterfowl hunt dates to the proposed new area and not to allow youth hunting in the rest of the regular waterfowl hunting area between Parking Lots 1 and 8, IDFG and the Refuge decided that the best youth hunting opportunity would be provided by allowing hunting during the designated youth waterfowl hunt dates in the regular waterfowl hunting area between Parking Lots 1 and 8.

42. **Comment summary:** Requested that lead shot, bullets, and sinkers be banned to reduce impacts "to avian scavengers, like Bald Eagles, and diving water birds, like grebes and loons" and affects to air, water, and soil quality.

    Response: Lead shot has been and would continue to be banned on the Refuge. Lead shot is the perfect size and shape for dabbling waterfowl to pick up and store in their crop, which can cause a variety of toxicity problems for both the waterfowl that eat the shot and predators that may eventually eat the waterfowl. Lead bullets have not been banned because their larger size prevents their ingestion by most wildlife.

    There is some concern as to the toxicity of lead tackle and bullets with certain species but the extent of these problems does not seem to be as dire or as well supported in the literature as the use of lead shot. Whenever possible, refuges try to be consistent with State rules and regulations regarding fish and game in order to avoid confusion. The State of Idaho does not currently ban the use of lead fishing tackle. If new findings surface regarding impacts to wildlife from lead tackle the Service will take appropriate measures.

H.1.2.11 Fishing

43. **Comment summary:** Request to allow ice fishing in Fishing Areas A and B, 200 yards in front of the Lower and Upper Dams.

Response: In response to these comments, changes have been incorporated in the Final CCP/EIS to allow ice fishing in Fishing Areas A and B within 200 yards of the dams, subject to areas posted by the Bureau of Reclamation. Lake Lowell is currently closed to boating from October 1 through April 14 to provide habitat for wintering waterfowl and reduce disturbance from human-caused flushing events. However, human-powered boats are allowed in Fishing Areas A and B to allow wildlife-dependent recreational opportunities with minimal disturbance to wildlife. Restricting ice fishing to these areas would reduce disturbance to waterfowl using the lake but would still provide ice fishing opportunities when ice conditions allow. Anglers would be responsible for checking ice conditions and confirming that they are safe.

44. **Comment summary:** Expressed concern that non-Preferred Alternatives 3 and 4 would close to access "several of the best fishing spots on Lake Lowell" and therefore concentrate anglers into lower-quality areas, shorten the boat-fishing season (Alt 3), and increase the time required to access preferred fishing spots because of no-wake zones, thus reducing fishing time.

    Response: The Service selected the Preferred Alternative (Alternative 2), since it provides the best balance to protect wildlife and habitat while also providing quality wildlife-dependent recreational opportunities.

    NEPA requires that a range of alternatives be considered when developing a CCP/EIS. This range of alternatives helps Refuge staff develop, track, and present a variety of ideas to the public. This process has helped stimulate useful discussions and ideas that ultimately shaped the Preferred Alternative.

45. **Comment summary:** Several comments indicated that there is some confusion about what fishing access would be allowed in the Preferred Alternative. Included in these comments were requests to allow fishing at the north end of Murphy's Neck, to create more year-round fishing opportunities, and to clarify regulations for wading anglers from February 1 to July 31 when lakeshore access is restricted to 100 yards of shoreline on either side of trails accessing the lakeshore.

    Response: The Preferred Alternative allows shoreline fishing at the north end of Murphy's Neck from March 15 through September 30. It is closed the rest of the year to reduce disturbance to wintering waterfowl. The Preferred Alternative also increases year-round fishing opportunities by allowing shoreline fishing from any open shoreline during waterfowl hunting season, rather than just from Fishing Areas A and B. This has been clarified in Objective 3.1 in Section 2.5.3. Finally, the Preferred Alternative does allow wading access to fishing anywhere at Lake Lowell from April 15 to September 30. In areas where walking access to the shoreline is limited to maintained roads and trails during the nesting season, bank fishing is limited to 100 yards of shoreline on either side of trails accessing the lakeshore. Note that anglers can wade anywhere during these times. This has also been clarified in Objective 3.1 in Section 2.5.3.

46. **Comment summary:** Requested that Lake Lowell not be closed to bass fishing.

Response: The Service has not considered closing Lake Lowell to bass fishing. In fact, the CCP/EIS process has sought to improve conditions for wildlife-dependent users like bass anglers while balancing the needs of wildlife.

H.1.2.12 Wildlife Observation and Photography

47. **Comment summary:** Request that access be allowed in Fishing Areas A and B for all wildlife-dependent activities throughout the year.

    Response: All wildlife-dependent recreational activities are allowed in that area between April 15 and September 30 from any type of boat, and during the rest of the year from human-powered boats. However, local weather conditions make safety a major concern for recreational users who rely on the structural integrity of the ice on Lake Lowell to enjoy their sport (see Section 2.3.1). In addition, ice fishing would be allowed in the Preferred Alternative, so there would be additional safety concerns associated with the possibility of falling into fishing holes. Finally, Lake Lowell is currently closed to boating from October 1 through April 14 to provide habitat for wintering waterfowl and reduce disturbance from human-caused flushing events. Unlike fishing, which cannot be conducted from the shoreline when the lake is covered with ice, other wildlife-dependent activities can still be conducted from shore. All ice-based activities other than fishing would therefore be prohibited.

H.1.2.13 Environmental Education and Interpretation

48. **Comment summary:** The National Park Service requested that the Refuge interpret and mark the Oregon Trail corridor on the Refuge.

    Response: The Refuge would be happy to work with the regional National Trails office of the National Park Service to identify, mark, and interpret the Oregon Trail corridor on the Refuge.

49. **Comment summary:** Request that an interpretive sign be installed at the boat ramp at Walter's Ferry to educate people about swallows and their value in controlling insects so as to reduce harassment of swallows that nest under the Walter's Ferry bridge.

    Response: Although the Refuge does currently have a kiosk at the Walter's Ferry boat ramp that includes Refuge information and a map of the adjacent section of the Snake River Islands Unit, that boat ramp is not managed by the Refuge. We will pass this comment along to IDFG, who do manage that ramp, and would be happy to partner with IDFG to develop and install further interpretive signs at this and other Snake River Islands Unit access points to educate visitors about wildlife.

H.1.2.14 Partnerships

50. **Comment summary:** Request that Refuge staff work with partner agencies to conduct law enforcement activities, and develop and conduct environmental education activities.

    Response: The Refuge appreciates the assistance of a variety of organizations and local, State, and Federal agencies in maintaining and improving existing Refuge programs. As

identified in Objective 6.2 of Section 2.5.1, the Service plans to maintain existing partnerships and build additional partnerships to increase partner knowledge of the Refuge's purpose and leverage resources to increase the effectiveness of the Refuge's programs in environmental education and interpretation, fishing, hunting, wildlife photography and observation, compatible nonwildlife-dependent surface-water recreation, water quality, urbanization and agriculture, and invasive species.

51. **Comment summary:** The Canyon County Commissioners stated that "Canyon County will not allow its legislative or executive power to be used to enforce the on-water regulations proposed by FWS." In addition, "in the event FWS provides the Refuge with federal law enforcement personnel and resources sufficient to enforce its regulations, Canyon County will cease its provision of Parks assistance and labor (without which the Refuge will apparently be unable to maintain appropriately hygienic conditions in its bathrooms, mowed lawns, or parking lots) to the Refuge."

    Response: The Refuge considers Canyon County to be a valuable partner in law enforcement as well as maintenance of public use areas and would like to continue to work with the county. We appreciate that the county currently provides most of the on-water law enforcement at Lake Lowell and the maintenance of recreational facilities at the Lower Dam Recreation Area (e.g., irrigating and mowing lawns, cleaning restrooms, and maintaining buoys).

    As noted in Appendix B, if the county discontinued their assistance and labor, there would be additional Refuge costs and labor associated with maintaining various uses, and Refuge management would have to re-assess our ability to provide the recreational opportunities that are currently available.

H.1.2.15 Nonwildlife-Dependent Recreation

52. **Comment summary:** Although recognizing that the sole purpose of the Reclamation project at Lake Lowell was to capture and deliver irrigation flows, the Board of Control states that Reclamation has a duty to provide recreational facilities and opportunities for the public and that the Service must be mindful of Reclamation's responsibility in this regard.

    Response: Reclamation advises us that neither the project authorization nor its statutory authority creates a duty to provide public recreation at Lake Lowell. As the commenter recognizes, the 1905 Lake Lowell authorization does not provide any authority for recreation or require Reclamation to ensure that recreational facilities are provided. The commenter may be referring to the Federal Water Project Recreation Act, Public Law 98-72, which governs Reclamation's recreation authority if the project authorization does not provide for recreation. However, it is Reclamation's position that this statute encourages, but does not require, Reclamation to provide recreational opportunities and facilities in cooperation with non-Federal partners and by using cost-sharing. It does not add recreation as a project purpose to a Reclamation project or impose a Federal recreation obligation. Significantly for Lake Lowell, P.L. 98-72 also excludes areas that are administered by a Federal agency "in connection with an authorized Federal program for the conservation and development of fish and wildlife" (16 U.S.C. § 460l-12).

53. **Comment summary:** Canyon County states that the Federal government does not have authority to control on-water uses of a reservoir in which it does not have water rights, and therefore, the Service has no regulatory authority over surface water uses of Lake Lowell.

Response: We agree that the Federal government does not have a water right for the water collected at Lake Lowell and we have not asserted that a water right is the legal basis for the Federal government's authority to regulate surface uses. Rather, the basis for this authority is Federal ownership of the lands underlying the reservoir, the United States Constitution, and Federal statutes.

The lands under Lake Lowell were withdrawn or acquired by the United States prior to completion of the reclamation project in 1909.[1] On February 25, 1909, President Theodore Roosevelt established the Deer Flat Bird Reservation by Executive Order 1032. President Franklin D. Roosevelt issued a new executive order on July 12, 1937 revoking E.O. 1032 and establishing the Deer Flat Migratory Waterfowl Refuge. Although the lands were reserved for refuge purposes subject to use by the Department of the Interior (DOI) for reclamation operations and incidental purposes, they are included in the National Wildlife Refuge System (16 U.S.C. § 668dd(a)(1)). See also 16 U.S.C. § 668dd(a)(6) (stating that each area included in the refuge system by an executive order will continue to be part of the Refuge System until otherwise specified by an Act of Congress).

The Property Clause contained in Article IV, § 3 of the Constitution gives Congress authority to make rules governing the property of the United States. As it relates to the National Wildlife Refuge System, Congress has exercised this power by enacting a number of laws that authorize the Secretary of the Interior, through the Service, to regulate activities on national wildlife refuges, including waterborne activities. For example, the National Wildlife System Administration Act (NWRSAA), as amended, authorizes the Secretary, "under such regulations as he may prescribe, to …. permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he determines that such uses are compatible with the major purposes for which such areas were established …." (16 U.S.C. § 668dd(d)(1)(A)). The NWRSAA also states that "the Secretary shall not initiate or permit a new use of a refuge or expand, renew or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety." (16 U.S.C. § 668dd(d)(3)(A)(i)). The Refuge Recreation Act permits the Secretary to administer refuge areas for public recreation, but only to the extent that it is "not inconsistent with …. the primary objectives" for which the area was established (16 U.S.C. § 460k). It also directs the Secretary to curtail public recreation within areas whenever he considers such action to be necessary. Thus, both the NWRSAA and Refuge Recreation Act provide authority to the Service to control activities on national wildlife refuges. In fact, under the terms of these laws, such

[1] Two parcels were owned by the State. On February 24, 1909, the State granted the United States a right-of-way over and across these parcels in perpetuity for construction and maintenance of the reservoir. These two parcels were included in the description of the refuge in both E.O. 1032 and E.O. 7655 and are managed as part of the refuge.

activities may not take place unless permitted. These statutory provisions have been implemented by the Service in regulations found at 50 C.F.R. Subchapter C. The regulations describe the process for opening a refuge to public access and use and, in relevant part, prohibit boating and water-skiing unless otherwise permitted (50 C.F.R. §§ 27.32-33).

Likewise, Reclamation's jurisdiction over water-borne activities on its facilities does not depend on ownership of a water right. Federal law provides that the United States holds the right to manage and operate Reclamation projects (43 U.S.C. §§ 491, 498; United States v. Pioneer Irrigation District, 157 P.3d 600, 603 (Idaho 2007). Reclamation's regulations govern the use of Reclamation facilities by the public, including recreation and boating. The preamble to this regulation explains that Reclamation has proprietary jurisdiction over its facilities and property, including water legally stored in such facilities under state law (71 Federal Register 19790, 19791 (Apr. 17, 2006)). However, it is important to note that Reclamation regulations also provide that public conduct on Reclamation lands and waterbodies administered by other Federal agencies under statute or other authority will be governed by the regulations of those agencies (43 C.F.R. § 423.3(d)).

In a further analogy, the State laws regulating boating and other uses on navigable waters within the State (although not purporting to control Federal reservoirs) are not tied to the existence of a water right. Therefore, we are not aware of any legal basis to conclude that ownership of a water right is a necessary prerequisite to regulating surface uses of Lake Lowell.

54. **Comment summary:** Proposal to provide camping facilities, perhaps at Gotts Point.

Response: Camping is considered appropriate on a national wildlife refuge only when no reasonable (based on time, distance, and expense) lodging opportunities are available off-refuge and when staff resources needed to manage camping do not detract from the quality of another priority wildlife-dependent recreational use. There are other nearby private and public campgrounds that accommodate both recreational vehicles (RVs) and tent campers with a better level of service; therefore, camping would continue to not be allowed.

55. **Comment summary:** Request to continue allowing swimming at various locations at Lake Lowell, rather than being allowed only at designated areas at the Lower Dam Recreation Area and Upper Dam as proposed in the Draft CCP/EIS in the Preferred Alternative.

Response: The Final CCP/EIS has been modified to direct swimmers to designated areas at the Lower Dam Recreation Area and the east end of the Upper Dam to minimize safety concerns and reduce impacts of swimmers on wildlife and wildlife-dependent recreationists, but to continue allowing swimming everywhere at Lake Lowell, with the exception of around fishing or other wildlife-dependent facilities (e.g., docks), or immediately adjacent to boat launch areas. For more information, see rationale for Objective 1.4 in Section 2.5.1.

56. **Comment summary:** Support for the proposal to require that dogs be leashed, both because of their effect on wildlife and habitat and because of concern for safety of other visitors, as well as a request that dogs be allowed off leash when nobody else is around.

    Response: The Final CCP/EIS requires that dogs be leashed except when accompanying someone engaged in allowed hunting, that leashed pets remain on designated trails and in the Lower Dam Recreation Area, and that visitors with leashed pets bag and remove fecal material. Although walking with pets is not a wildlife-dependent recreational activity, it is often conducted in conjunction with wildlife-dependent uses like wildlife observation, photography, and interpretation. The potential for wildlife disturbance is minimal when the use is conducted in accordance with the stipulations listed above. See the Walking with Pets (other than hunting dogs) compatibility determination in Appendix B for more information.

57. **Comment summary:** Request that ice skating be allowed.

    Response: Because of local weather conditions, safety is a major concern for recreational users who rely on the structural integrity of the ice on Lake Lowell to enjoy their sport (see Section 2.3.1). In addition, ice fishing would be allowed in the Preferred Alternative, so there would be additional safety concerns associated with the possibility of falling into fishing holes. Finally, Lake Lowell is currently closed to boating from October 1 through April 14 to provide habitat for wintering waterfowl and reduce disturbance from human-caused flushing events. Unlike fishing, which cannot be conducted from the shoreline when the lake is covered with ice, other wildlife-dependent activities can still be conducted from shore. All ice-based activities other than fishing would therefore be prohibited.

58. **Comment summary:** Request that Refuge staff plant “a new generation of shade trees for years of future nonwildlife related uses at the park areas located at both ends of the lake.”

    Response: The park located adjacent to the east Upper Dam boat launch is a Canyon County park. The Refuge will convey this comment to the Canyon County Department of Parks, Recreation, and Waterways.

    The Service plans to maintain shade trees at the Lower Dam Recreation Area because this area provides a different habitat type than is found elsewhere on the Refuge (open canopy with limited understory) and particularly benefits waterfowl and raptors, especially in winter.

59. **Comment summary:** Commenter spent time on Lake Lowell with his father as a child and would like to pass on the same experiences to his children and grandchildren.

    Response: The proposed actions delineated in the Preferred Alternative allow for a variety of recreation throughout the year. All of the activities that are currently enjoyed on the Refuge would continue to be allowed with only a few changes that seek to promote wildlife protection and encourage more use by wildlife-dependent users.

60. **Comment summary:** Request that sailing regattas be allowed because they do not exclude the general public, increase wildlife disturbance, increase safety concerns, or require additional management resources; they enhance wildlife-dependent activities; and they provide a positive economic impact for the state and local vendors. Some commenters were even concerned that all sailing would be prohibited.

    Response: In response to comments, changes have been incorporated in the Final CCP/EIS to allow sailing regattas with certain stipulations to address concerns about safety and interactions with other users. For further information about the activity and required stipulations, see the appropriate use determination in Appendix A and compatibility determination in Appendix B.

    In addition, as noted in Appendix B, currently most on-water law enforcement and boating-related dock maintenance is provided by the Canyon County Sheriff's Office. If the Sheriff's Office decided to discontinue this assistance, there would be additional costs associated with maintaining this use and the ability of the Refuge to provide this use may be impaired.

H.1.2.16 Boating—General

61. **Comment summary:** Proposed to extend the boating season beyond the current season (April 15-September 30) by either having an earlier start or a later end to the boating season, or by allowing boating all year.

    Response: Deer Flat National Wildlife Refuge was established primarily for the protection of migratory birds and other wildlife (see Section 1.7.2). As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the "fundamental mission" of the National Wildlife Refuge System "is wildlife conservation: wildlife and wildlife conservation must come first." The Refuge Administration Act also identifies six priority wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on refuges, where compatible with the wildlife and wildlife habitat mission. However, where conflicts arise between protections for wildlife and habitat and providing wildlife-dependent recreation, priority must be given to wildlife and habitat. The Service has determined that the existing boating season provides appropriate wildlife protections.

62. **Comment summary:** Proposal "that the time boats have to be off the water be tied to civil twilight (half-hour after sunset). Currently, the time boats have to be off the water approximates twilight, but is not tied to it. The results are that sometimes, one must be off the water 15 or 20 minutes before is really necessary, and also that someone has to change the signs that tell the time boats need to be off the water." Suggested that instead of posting a time when boats must be off the water, the Refuge should notify boaters that they must be off water by civil twilight and then post a table showing the times of civil twilight throughout the boating season.

    Response: The time boats must be off the water cannot be tied directly to civil twilight, because the Refuge closes to visitors at civil twilight, and boaters need time to trailer and prepare their boats in order to depart before civil twilight. It is especially important that

boaters be prepared to depart by civil twilight at the Lower Dam Recreation Area, where an automatic gate closes and prevents boaters from exiting the parking lot shortly after civil twilight. The Refuge considered but rejected the idea of extending Refuge hours beyond civil twilight because of concerns for visitor safety and to reduce potential illegal activity after dark.

There are currently signs at the major boat ramps (east Upper Dam, west Upper Dam, and Lower Dam Recreation Area) that indicate "Boats must be off water by…" with the time indicated on an interchangeable time sign. These signs were installed at the request of the Canyon County Sherriff's Office Marine Patrol officers to better communicate to boaters the end of boating hours and help officers ensure that boaters would be off the water in sufficient time to allow officers to safely search for and assist or rescue any stragglers who might be having mechanical or safety concerns. They also help boaters plan their departure before the gate closes at the Lower Dam Recreation Area.

As the commenter points out, because Refuge staff insert the appropriate time sign as sunset shifts during the season, it is not possible to always have the boats off water time match an appropriate time between sunset and civil twilight. Currently, the boats off water sign is changed so that it indicates a time anywhere from one to thirty minutes after sunset, to provide time to depart before civil twilight.

Given that boaters require different amounts of time to trailer and prepare their boats for departure, the Service will discuss with the Canyon County Sherriff's Office Marine Patrol the possibility of replacing the "Boats must be off water" signs with "Gate closes at" signs (for the Lower Dam Recreation Area) or "Refuge closes at" signs (for the Upper Dam boat ramps) that would indicate times anywhere from one to thirty minutes after civil twilight. Alternatively, the Service would notify boaters that they must be off-water by civil twilight and post a table showing the times of civil twilight throughout the boating season as suggested by the commenter. Either approach could allow boaters a bit more flexibility to plan their boating and still comply with the Refuge closure time.

63. **Comment summary:** Expressed concern that motorized boating should be eliminated or restricted to no-wake because high-speed motorized boating is unsafe, causes wildlife disturbance, detracts from user experiences, was not foreseen when the Refuge was established, and is available at many other local lakes and reservoirs that are not National Wildlife Refuges. Suggests that there be one day a week or even a half day during which the lake is open only to no-wake activities.

Response: The use of a boat often provides a vehicle for participating in wildlife-dependent recreational activities (e.g., fishing, wildlife observation, and photography), so boating is often allowed on national wildlife refuges. Typically, however, high-speed boating and tow-behind activities are not permitted on national wildlife refuges. As noted in Section 5.5.1, because the Refuge was unstaffed in its early history and because of an erroneous assumption that administrative responsibility for on-water uses rests with Reclamation, recreational activities that would typically not be allowed on a Refuge have been allowed at Deer Flat NWR.

Refuge staff worked closely with regional and national staff to identify areas where traditional uses such as high-speed boating could continue to take place while still

providing adequate habitat for wildlife. Nonwildlife-dependent boating visitors provide the Refuge opportunity to reach out to nontraditional user groups and to encourage boating users to observe wildlife and learn about the NWRS. Due to the close proximity of the Refuge to the cities of Nampa and Caldwell, the number and variety of users to this urban refuge are expected to grow. For many of these people, boating at Lake Lowell may provide an introduction to a national wildlife refuge

The Service considers that with the stipulations identified in the Recreational Boating Compatibility Determination (e.g., seasonal closures and no-wake zones, see Appendix B), high-speed boating and tow-behind activities can be compatible with the Refuge purpose and the mission of the NWRS. The Service proposes to monitor impacts of boating activities annually to assess compliance with these stipulations, impacts to waterfowl, shorebirds, waterbirds (especially *Aechmophorus* grebes), and other migratory birds as well as wildlife habitat, and conflicts between user groups. Monitoring data would be used to modify these stipulations if necessary to ensure continued compatibility of these activities.

64. **Comment summary:** Proposed banning two-stroke motors and unmufflered modified V-8 automobile engines because of the levels of pollution, exhaust, noise and speed that they produce. Proposed a limit on the size of boats.

Response: The size of boats is already limited by the size of existing boat ramps. There are no plans to expand the ramps to accommodate larger boats. The Service considered banning two-stroke motors, but was informed that some newer two-stroke engines are capable of performance similar to four-stroke engines. Also, where possible, the Service tries to be consistent with local regulations and there are no restrictions on motor type in this area. As proposed in Objective 1.4 in Section 2.5.1, the Service would enforce existing Idaho State noise ordinances and promote the use of CARB star-rated motors at the level of two stars and above. The Refuge is open to working with partners to assess the impacts of different kinds of motors on water quality and wildlife/habitat.

65. **Comment summary:** Questioned the ability to enforce the proposed noise ordinance and suggested that the decibel limit allowed on county and city streets may not be appropriate for a National Wildlife Refuge.

Response: The scientific literature related to decibel limits that will reduce disturbance for particular species is limited. As proposed in Objective 1.4 in Section 2.5.1, the Service would enforce existing Idaho State noise ordinances to be as consistent as possible with local regulations and increase protections for wildlife from noise disturbance.

Service law enforcement partners with State and local agencies to enforce regulations, and would continue to enforce Refuge regulations to the greatest extent possible.

66. **Comment summary:** Concerned that restricting current public use on Lake Lowell would negatively impact the environment through increased fossil fuel consumption and carbon dioxide emissions because some boaters would choose to drive farther to access recreational opportunities at another lake or reservoir.

Response: Although the Service is proposing to continue allowing all existing recreational activities, there would be some restrictions, including more no-wake zones and seasonal closures to protect sensitive wildlife habitat. As projected in Table 6-3, the Service does anticipate a reduction in the number of visitors participating in nonwildlife-dependent boating on the assumption that some users would be displaced from the lake because there is less area available for high-speed boating and tow-behind activities.

However, the Service anticipates that this would have a negligible long-term negative effect on air quality because it is unlikely that a large enough number of visitors would be displaced to cause a larger effect.

67. **Comment summary:** Questioned the feasibility of enforcing no-wake zones and other regulations given current rate of noncompliance with no-wake zones, current Refuge law enforcement staffing, and the difficulty of identifying distances from protected features that are not marked with buoys. Also questioned whether the cost of educating the public and purchasing buoys is worth the benefit.

Response: The Service intends to educate the public about the wildlife benefits of no-wake zones and seasonal closures through signs and brochures and hopes that an educated public will comply with regulations. However, we understand that this will not always be the case. Service law enforcement officers would enforce these and other Refuge regulations. Although Service enforcement staff is limited, they will do their best to respond as often as possible.

The proposed no-wake zones on the east end of the lake and at the Narrows would be clearly marked with buoys placed every 100 to 150 yards and should therefore be easily identifiable and enforceable. The proposed no-wake zone on the south side of the lake shifts with fluctuating water levels and would therefore not be marked with buoys. Officers would use appropriate discretion and provide necessary information when interacting with visitors who are unknowingly violating an unmarked no-wake zone versus those who are flagrantly violating no-wake zones.

68. **Comment summary:** Proposed that the Refuge dredge the “Narrows” and/or dredge or extend boat ramps.

Response: The Narrows is a narrow area that connects the East and West Pools. The Bureau of Reclamation established what is now called the “equalizer” in this area during the construction of the reservoir. The area is approximately three-quarters of a mile long and approximately 50 feet wide, varying throughout its entirety. The purpose of the equalizer was to maintain flow between the two pools at low surface elevations.

The lake bed topography in front of the west end of the Upper Dam and Lower Dam ramps does not have the necessary slope to extend current ramps. Dredging and maintenance dredging to obtain desired results is expensive, may adversely impact the environment (e.g., release contaminants bound in lake-bottom sediments), and is often complicated since suitable sites must be located for placement of the dredged material. Dredging more of the existing channel or said boat ramps would not provide wildlife value and would only be a temporary correction as wave action and substrate deposition will fill in manipulated areas.

H.1.2.17 Boating—Closures

69. **Comment summary:** Concern that limiting public access to some areas of the lake through seasonal closures and no-wake zones would be unsafe by forcing more boaters into a small area and would reduce awareness and appreciation for the Refuge because the Service is restricting access to places visitors currently enjoy.

    Response: The Service sought a balance between wildlife protections and recreational activities by emphasizing seasonal, movable closures to protect wildlife during sensitive times (e.g., nesting, migratory shorebird feeding and resting) rather than permanent on-water closures. Although these seasonal closures in the Preferred Alternative would reduce the area available for boating, they would be primarily concentrated in emergent vegetation along the shoreline. The majority of both pools of the lake would be available for high-speed boating, so the total acreage available for high-speed boating would be similar to the status quo alternative (compare Maps 4 and 5 in Chapter 2). In addition, under the Preferred Alternative all activities that have been enjoyed historically would still be allowed.

    By providing information about why seasonal closures and no-wake zones are in place, the Service anticipates that visitors will increase their awareness and appreciation of the Refuge, and by requiring travel through new or expanded no-wake zones at a no-wake speed, will increase awareness and appreciation by allowing visitors to better observe wildlife and habitat.

70. **Comment summary:** Suggests that boaters using electric motors, push poles and other manual propulsion devices be allowed to enter seasonal nesting closures to allow for wildlife-dependent activities without damaging nesting areas or disturbing wildlife. Commenters also observed that a fully mature emergent weed bed becomes impenetrable, eliminates human access, and creates protection for the nesting colony.

    Response: The seasonal closures were based on recommendations from disturbance literature (see rationale for Objective 1.4 in Section 2.5.1). Allowing any type of human presence into the closure, whether motorized or nonmotorized, causes wildlife disturbance, so there would be no exceptions to the seasonal closures proposed in the Final CCP/EIS.

71. **Comment summary:** Requests clarification of how the proposed 500-yard grebe nesting closures will be implemented and suggests that a 1,000-yard closure measured from a nest at the center of the colony be implemented.

    Response: The sizes of seasonal wildlife closures for important wildlife areas (e.g., nesting, foraging) were determined using the best available science (see Recreational Boating Compatibility Determination in Appendix B). The suggested buffer for nesting grebes is 500 yards. To determine grebe colony boundaries, the staff biologist would mark nests within, and especially on the periphery of, a colony using a global positioning system (GPS) capable of sub-meter accuracy as part of the regular colony studies. These data points would be exported to a geo-referenced mapping system and up to a 500-yard buffer would be drawn around the colony. Buoy locations would then be mapped every 100 to 150 yards and exported back into the GPS unit to be used to place the buoys in the

proper location. In the first year that grebes nest, the closure would be based on nests established by early in the nesting season. In the second year of a grebe nesting closure, the closure would be based on the full extent of the colony in the first year.

72. **Comment summary:** Expressed support for closures to protect nesting habitat, and in particular supported the concept of seasonal, movable closures to protect important wildlife areas.

Response: The Service acknowledges these comments, as well as the scoping comments that proposed the idea of flexible seasonal closures.

73. **Comment summary:** Wants the Service to identify the maximum amount of habitat necessary to protect a given species so that the seasonal, movable closures around sensitive wildlife areas (see Recreational Boating Compatibility Determination in Appendix B) could not end up including most of the emergent beds as proposed in Alternatives 3 and 4.

Response: Deer Flat National Wildlife Refuge was established primarily for the protection of migratory birds (see Section 1.7.2). As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the "fundamental mission" of the National Wildlife Refuge System "is wildlife conservation: wildlife and wildlife conservation must come first." The Refuge Administration Act also identifies six priority wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on refuges, where compatible with the wildlife and wildlife habitat mission. However, where conflicts arise between protections for wildlife and habitat and providing wildlife-dependent recreation, priority must be given to wildlife and habitat.

The species the Service is proposing to protect with seasonal closures (e.g., grebes, herons, etc.) require specific types of habitat for nesting. Because of limited availability of suitable habitat (e.g., vegetation, water level, etc.), it is unlikely that they would nest in a way that would result in seasonal closures like those proposed in Alternatives 3 and 4. This limited availability of adequate habitat is the reason that the Service shifted from proposing permanent closures of emergent beds (as during presentation of preliminary draft alternatives) to seasonal, movable closures that provide wildlife protections while also maintaining space available for wildlife-dependent recreation.

74. **Comment summary:** Expressed concern that the proposed seasonal closures would restrict access to prime fishing spots and other recreational activities. Suggested that unless grebes often re-use the same nesting colony, the proposal to continue grebe nesting closures through July 15 of the following year should be eliminated. Also suggested that seasonal nesting closures should "end at the normal fledging date for the affected species."

Response: See first paragraph of response to comment #73, above, for discussion of relative priorities of wildlife and wildlife-dependent recreation.

Nesting grebes at Lake Lowell have typically used the same area to set up their colonies from year to year, and the Refuge is attempting to limit human-caused disturbance in those areas at the beginning of the nesting and boating season when grebes are establishing territories.

The seasonal closures have been proposed to begin and end at appropriate times (e.g., the start of nest territory establishment and typical fledging time for nesting closures and the typical arrival and departure of migrating shorebirds for seasonal shorebird closure) based on best available science and observations at Deer Flat NWR.

75. **Comment summary:** Suggested that the Refuge expand the seasonal closure around the bald eagle nesting area if needed.

    Response: The size of the seasonal nesting closures are based on recommendations presented in peer-reviewed literature that the Refuge considers best available science. If the size or seasonal restrictions prove to be inadequate in the future, the Refuge will take appropriate measures to adjust accordingly.

76. **Comment summary:** Suggested that the emergent vegetation on the south side of the lake be protected by a 50-yard buffer closed to human entry.

    Response: A similar closure was proposed in Alternatives 3 and 4. The Service considers that the Preferred Alternative would adequately protect wildlife while still allowing access to popular fishing areas along the south shore.

H.1.2.18 Boating—No-Wake Zones

77. **Comment summary:** Expressed opposition to the proposed Narrows no-wake zones because of safety concerns when reducing speed in the Narrows in windy conditions, because the Narrows is not “narrow” when water levels are high, because a no-wake zone will discourage boaters from traveling from the East Pool to the West Pool when water levels are low, thus concentrating usage in the East Pool, and because it is a new proposal that was not included in the preliminary draft alternatives. Expressed support for this no-wake zone because it would reduce disturbance from wake to anglers fishing in the Narrows.

    Response: As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the “fundamental mission” of the National Wildlife Refuge System “is wildlife conservation: wildlife and wildlife conservation must come first.” The Refuge Administration Act also identifies six priority wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on Refuges, *where compatible*. Compatibility determinations have been developed for both fishing and recreational boating activities (see Appendix B). In order for on-water recreational activities to be compatible, it has been determined that the stipulations laid out in Appendix B must be followed, including the reduction of disturbance provided by no-wake zones and seasonal closures.

No-wake zones are a common management tool that allows use in sensitive areas. For example, public boat docks are typically surrounded by a no-wake zone to reduce the danger of fast-moving vessels and the wake they create in such high-use areas. No-wake zones require boaters to slow down and be more aware of their surroundings. The Refuge has a number of sensitive areas, including irrigation structures, boat ramps, swimming areas, high public use areas, and sensitive wildlife habitats.

The Narrows no-wake zone was proposed in the preliminary draft alternatives and in the draft Preferred Alternative because this pinch point that connects the two larger pools of the lake has several sensitive areas. The south shore has a large expanse of smartweed that is used as nesting and foraging habitat by a variety of migratory birds. The north shore has historically had a bald eagle nest in the strip of trees along the lakeshore. Also, anglers congregate in the middle of the Narrows on a feature known as the "Equalizer" that channels water between the two pools and holds large quantities of bass. A no-wake zone in this area still allows passage to both pools, reduces the amount of wake that affects nesting water birds and stationary anglers, and slows boaters down so that they are more aware of their surroundings and can more easily avoid collisions with waterbirds or anglers and other boaters.

78. **Comment summary:** Expressed opposition to the proposed no-wake zone on the south side of the lake because it is unnecessary given that after May 30, "access into the emergent weed beds becomes virtually impossible." Suggested that the no-wake zone be narrowed to 200 feet rather than 200 yards. Expressed support for this no-wake zone to protect habitat.

Response: Although it may be difficult to enter the emergent weed beds in late spring and summer, the proposed no-wake buffer actually requires no-wake speeds within 200 yards of the edge of the emergent bed. This would reduce disturbance to nesting, resting, and foraging birds from both the noise and speed of fast-moving boats. See also the general discussion of no-wake zones in the first two paragraphs of the response to comment #77 and compatibility determinations in Appendix B.

79. **Comment summary:** Expressed opposition to the proposed expansion of the no-wake zone on the east end of the lake because its placement appears to be arbitrary and the benefit is unclear, because it is a preferred area for water skiing. The Boise Sailors Association suggested that the no-wake zone boundary be shifted to the east boundary of the Gotts Point parking lot. Expressed support for this no-wake zone because it will reduce the risk of a fishing boat getting knocked against the concrete fish structure east of Gotts Point.

Response: During the CCP scoping process, the Service received requests from anglers, wildlife watchers, and photographers to provide more areas to conduct their activities with minimal disturbance from high-speed boating activities. The proposed expansion of the no-wake zone also reduces safety concerns associated with the concrete fish structures east of Gotts Point. The expansion of the existing no-wake zone on the east end of the lake was proposed primarily to accommodate these requests and to provide an area with less wildlife disturbance. Some suggested that the no-wake zone be expanded even farther, to start at Parking Lot 2 rather than Parking Lot 1.

Deer Flat National Wildlife Refuge was established primarily for the protection of migratory birds (see Section 1.7.2). As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the "fundamental mission" of the National Wildlife Refuge System "is wildlife conservation: wildlife and wildlife conservation must come first." The Refuge Administration Act also identifies six priority wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on refuges, where compatible with the wildlife and wildlife habitat mission. Finally, other activities can be allowed if deemed appropriate (see Appendix A) and if they can be implemented without impairing existing or future wildlife-dependent uses. Therefore, where conflicts arise between protections for priority wildlife-dependent recreational activities and other recreational activities, priority must be given to the priority wildlife-dependent recreational activities.

Gotts Point is one of the most popular locations at Lake Lowell for shoreline anglers, and this no-wake boundary was devised to include all of Gotts Point to minimize disturbance from wake for shoreline anglers. Also, having the no-wake-zone boundary terminate at a prominent point is valuable to visitors and law enforcement because it provides a clearer visual reference to help understand and enforce the limits of the no-wake zone.

80. **Comment summary:** Proposed removing the concrete fish structures east of Gotts Point.

Response: The current cement structures provide habitat for fish and will remain in Lake Lowell.

81. **Comment summary:** Questioned why it is necessary to control boat wakes given that wind creates waves too.

Response: While wind does produce waves, unpredictable, omni-directional wake created by boats is more difficult for wildlife to adapt to than waves created by wind. Wildlife species like colonial surface-water nesters can generally adapt to waves that result from a prevailing wind. Storm events that are capable of destroying nests and nesting habitat are part of the natural order of things. Although wake from wind can be damaging, the purpose of the proposed no-wake zones is to reduce the amount of human-caused disturbance from wake in order to improve nesting success.

As noted in Section 1.6.2.2, according to the Refuge Administration Act, as amended, the "fundamental mission" of the National Wildlife Refuge System "is wildlife conservation: wildlife and wildlife conservation must come first." The Refuge Administration Act also identifies six priority wildlife-dependent recreational activities for the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) that the Service should make extra efforts to facilitate on refuges, *where compatible*. Compatibility determinations have been developed for both fishing and recreational boating activities (see Appendix B). In order for on-water recreational activities to be compatible, it has been determined that the stipulations laid out in Appendix B must be followed, including the reduction of disturbance provided by no-wake zones and seasonal closures.

82. **Comment summary:** Observed that "a fishing boat going slow, 5mph, in a no-wake zone, actually creates a bigger wake than when that same boat is 'on plane.'"

Response: Given that the size of a boat's wake at any given speed depends on the design of the boat, to minimize disturbance to wildlife and wildlife-dependent recreationists the Service has proposed no-wake zones with the requirement to travel <5 mph. Within no-wake zones, boaters would therefore be required to slow down to less than 5 mph or a slower speed if that is required for their boat to not produce a wake.

83. **Comment summary:** Suggested that certain groups (including law enforcement, administration, and anglers or tournament anglers) not be required to comply with no-wake zones and closed areas.

Response: Management activities (e.g., law enforcement) are exempted from regulations as required to achieve management goals, but would be done in a way that minimizes wildlife disturbance to the greatest extent possible.

Priority wildlife-dependent and nonwildlife-dependent recreational activities can be allowed on national wildlife refuges only when determined to be compatible with wildlife and wildlife habitat. To ensure that these activities are compatible, the compatibility determinations (see Appendix B) include stipulations necessary to ensure compatibility. Compatibility determinations for fishing and recreational boating both require compliance with proposed closures and no-wake zones to minimize disturbance to wildlife and habitat. Allowing exceptions for certain users would both increase wildlife disturbance and be unfair to other recreationists who did not receive similar exemptions.

H.1.2.19 Economic Effects

84. **Comment summary:** Expression of concern that additional restrictions to current public uses would have a negative economic impact on local businesses (e.g., boat- and fishing-related businesses and convenience stores), state boat license revenue, and local housing values.

Response: According to the economic effects analysis compiled by the Policy Analysis & Science Assistance Branch of the U.S. Geological Survey (USGS), the selected alternative would have a negligible long-term positive effect on the economy of Ada and Canyon Counties. See Table 6-1 and Section 6.6, Economic Effects.

85. **Comment summary:** Proposal to open Lake Lowell to all recreational activities all year to provide an economic benefit to gas stations, boat dealers, sporting goods stores, etc.

Response: Deer Flat National Wildlife Refuge was established primarily for the protection of migratory birds (see Section 1.7.2). The existing boating season (April 15-September 30) has been in effect for many years and was established to provide adequate habitat with minimal human disturbance for migratory birds during migration and over-wintering at Lake Lowell. The Service considers that reducing the existing boating closure (October 1-April 14) would increase disturbance to migratory birds and other wildlife and would therefore contradict the Refuge's purpose.

86. **Comment summary:** Idaho Department of Parks and Recreation expressed concern that Alternatives 3 and 4 would alter the intent of projects funded through Waterways Improvement Fund grants awarded to Canyon County and result in a conversion. Idaho Administrative Procedures Act (IDAPA) Rule 26.01.31.350 regarding conversions requires, "No project funded by Recreational Program Grant Funds shall, without the prior written approval of the director, be converted to uses other than for the authorized purposes specified in the original recreational program grant application, grant agreement, or Memorandum of Understanding."

    Response: Selection of the Preferred Alternative (Alternative 2) would not alter the intent of previously funded Waterways Improvement Fund grants to Canyon County.

87. **Comment summary:** Requested that the plan "prevent mining, or other industrial exploitation, including above and below ground water diversion."

    Response: Any activity on Refuge lands has to be appropriate and compatible with the purpose of the Refuge. Since the purpose of this Refuge is to serve as a refuge and breeding ground for migratory birds and other wildlife it is unlikely that mining or other industrial activities could be considered appropriate and compatible. Water diversion, on the other hand, is the original and overlying purpose for the reservoir (Lake Lowell) and the Service does not have jurisdiction over how that is regulated and used.

88. **Comment summary:** Requested the plan "forbid the exchange of such lands for other lands offered by any private corporations or individuals for any purpose."

    Response: The Service does have the authority to exchange lands. Any proposals for land exchanges would be evaluated to assess whether the proposed exchange is in the interests of both the Bureau of Reclamation and the Service in carrying out their respective responsibilities at the Lake Lowell Unit of the Refuge or is in the interest of the Service for the Snake River Islands Unit of the Refuge.

H.1.2.20 Hydropower Facility

89. **Comment summary:** The Board of Control asserts that it has authority to build hydropower facilities on the Refuge and opposes any element of the CCP that might interfere with this authority, pointing specifically to their plans to develop Richard's Point Hydroelectric Project.

    Response: Pursuant to Executive Order 7655, which established the Refuge, the Service's jurisdiction over lands that were withdrawn for the Reclamation project is subject to "Reclamation work and incidental purposes." According to the Bureau of Reclamation, the project encompassing Lake Lowell was authorized with the single purpose of irrigation; hydropower was not an authorized project purpose. Therefore, we have operated under the principle that Refuge management cannot interfere with the irrigation purpose of the project and activities associated with the irrigation purpose, such as operations and maintenance activities, but that other activities, such as hydropower, can be allowed only if consistent and compliant with statutory and regulatory authorities governing Refuge management. While we are aware that the president recently signed into law P.L. 113-24, the Bureau of Reclamation Small Conduit Hydropower

Development and Rural Jobs Act, we do not know the extent of its applicability to the proposed Richard's Point project. However, we would be glad to discuss this with Reclamation and BPBOC as appropriate.

H.1.2.21 Editorial Comments

90. **Comment: "**The Draft CCP/EIS references the Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORTP) on Page 6-58. The draft EIS states 'According to the 2006-2010 Idaho SCORTP report (IDPR 2006), 73 percent of surveyed Idahoans said that the most they were willing to travel to their favorite outdoor recreation site for less than one day's activity was two hours or more.' The 2006-2010 SCORTP report actually found that the most Idahoans were willing to travel to their favorite outdoor recreation site for less than one day's activity was two hours or less, not more."

    Response: Correction has been made.

91. **Comment:** Page 5-27, 2nd paragraph—"Recommend changing the sentence 'Based on the assumption that administrative responsibility for on-water uses rested with Reclamation no compatibility determinations were developed for on-water recreation at this time' to something along the lines:

    Based on an erroneous assumption that administrative responsibility for on-water uses rested with Reclamation, no compatibility determinations were developed for on-water recreation at this time. Both the FWS and Reclamation have since confirmed that the USFWS has administrative responsibility for on-water uses as described earlier on page [insert page reference 1 for Lake Lowell]. This is because the USFWS's management of on-water uses will not conflict with Reclamation's off-stream storage of water in Lake Lowell for irrigation purposes; in addition, the USFWS's legal authorities provide that the USFWS needs to manage Lake Lowell for wildlife refuge purposes too."

    Response: Changed as follows:

    Based on an erroneous assumption that administrative responsibility for on-water uses rested with Reclamation, no compatibility determinations were developed for on-water recreation at this time. Both the Service and Reclamation have since confirmed that the Service has administrative responsibility for on-water uses at Lake Lowell as described earlier on page 1-1. The Federal Water Project Recreation Act, Public Law 98-72, governs Reclamation's recreation authority if the project authorization does not provide for recreation. It does not add recreation as a project purpose to a Reclamation project or impose a Federal recreation obligation. Significantly for Lake Lowell, P.L. 98-72 also excludes areas that are administered by a Federal agency "in connection with an authorized Federal program for the conservation and development of fish and wildlife." (16 U.S.C. § 460l-12).

92. **Comment:** Page 1-2, 4th paragraph—Suggest adding "maintenance" after "operation" in the first sentence, and clarifying that the Deer Flat Dams and diversion works are not reserved works in the last sentence.

    Response: Changes have been made.

93. **Comment:** Page 5-34, Table 5-7—"The following revisions should be made to the table: at Black Canyon Reservoir, Reclamation manages recreation while Idaho Department of Fish and Game manages the adjacent Montour Wildlife Management Area under an agreement with Reclamation. Boise National Forest manages recreation at Arrowrock and Anderson Ranch Reservoirs under an agreement with Reclamation. At Cascade Reservoir, Idaho Department of Parks and Recreation manages recreation along with Reclamation."

    Response: Changes have been made.

94. **Comment:** Page 1-25, 3rd bullet—"This statement should clarify that BPBOC has the day-to-day responsibility of controlling Lake Lowell water levels."

    Response: Change has been made.

95. **Comment:** Page 180 (3-32)—"The Implementation Plan was finalized in October 2012."

    Response: Proper citation to final Implementation Plan inserted.

96. **Comment:** Page 180 (3-32)—"Update to 2010 (or 2012) Integrated Report depending on whether it is approved by the time this is finalized."

    Response: Proper citation to 2010 Integrated Report inserted, and text modified as appropriate.

97. **Comment:** Page 182 and 182 (3-33 and 3-34)—"Special Resource Waters are no longer a use designation in our water quality standards. There is no longer a special resource category; we want to protect wildlife everywhere regardless of whether it is a designated wildlife refuge or management area. Wildlife habitat is an assumed use for all surface waters as listed in table 3-14."

    Response: Left unchanged because the term Special Resource Waters was used in the TMDL developed for Lake Lowell (IDEQ 2010) as cited.

98. **Comment:** A commenter requested that the plan explicitly state that "windsporters would be permitted short, direct crossing [of no-wake zones] and must not dwell nor conduct their 'play' within that band."

    Response: No change needed. Objective 1.4 in Section 2.5.1 already states that in the Preferred Alternative, kiteboarders and windsurfers would be allowed to launch from any open shoreline, but they must comply with no-wake zones.

Appendix I. Refuge Establishment History

- February 25, 1909, President Theodore Roosevelt signed Executive Order (E.O.) 1032 establishing several reservoir sites in the western United States, including the Deer Flat Reservoir, "as preserves and breeding grounds for native birds," subject to Bureau of Reclamation (Reclamation) uses and any other existing rights. The E.O. also states, "It is unlawful for any person to hunt, trap, capture, willfully disturb or kill any bird of any kind whatever, or take the eggs of such birds within the limits of these reservations, except under such rules and regulations as may be prescribed by the Secretary of Agriculture."

- January 12, 1937, Migratory Bird Conservation Commission (MBCC) Memorandum Number 13, "Snake River Migratory Waterfowl Refuge, Canyon and Owyhee Counties, Idaho," stated in the History section: "This unit embraces a group of islands in the Snake River. Its strategic location on that flyway and its proximity to the Deer Flat Reservation makes it an important refuge possibility. The islands within the proposed refuge limits fall in three legal classifications: natural islands surveyed by the General Land Office prior to 1890 when Idaho became a state; natural islands not survey by the General Land Office and therefore public domain; islands formed since 1890, titles to which are vested in Idaho. The purpose is to purchase some 640 acres of privately owned and State owned islands, and obtain jurisdiction over the public lands through E.O. Then arrange with the Idaho State Fish and Game Commission to close a portion of the adjacent river as a sanctuary…."

- July 12, 1937, President Franklin D. Roosevelt issued E.O. 7655 "Establishing Deer Flat Migratory Waterfowl Refuge, Idaho," revoking and superseding E.O. 1032. E.O. 7655 states "to effectuate further the purposes of the Migratory Bird Conservation Act (45 Stat. 1222), it is ordered that all lands owned or controlled by the United States within the following described area comprising 10,252.76 acres, more or less, in Canyon County, Idaho, be, and they are hereby, reserved and set apart for the use of the Department of Agriculture, subject to existing valid rights, as a refuge and breeding ground for migratory birds and other wildlife: Provided, that any private lands within the area described shall become a part of the refuge hereby established upon the acquisition of title thereto or lease thereof by the United States … Most of the above-described lands have been withdrawn for use in connection with the Deer Flat Reclamation Project and are primarily under the jurisdiction of the Department of the Interior; and the reservation herein made of such lands shall be subject to the use thereof by the said Department for reclamation work and incidental purposes.

- Executive Order No. 1032 of February 25, 1909, in so far as it reserved certain lands within a reservoir site in Idaho as the Deer Flat Bird Reservation, as modified, is hereby revoked. This refuge shall be known as the Deer Flat Migratory Waterfowl Refuge" (Federal Register, Volume 2, Number 135, Page 1454, July 15, 1937).

- August 17, 1937, President Franklin D. Roosevelt issued E.O. 7691 "Establishing the Snake River Migratory Waterfowl Refuge, Idaho": "to effectuate further the purposes of the Migratory Bird Conservation Act (45 Stat. 1222), it is ordered that all islands in the Snake River within the exterior limits of the following described area, owned or controlled by the United States, or of which the United States has the use for migratory bird refuge purposes, be, and they are hereby, withdrawn from settlement, location, sale, or entry, and reserved and set apart, subject to valid existing rights, for the use of the Department of Agriculture as a

refuge and breeding ground for migratory birds and other wildlife; *Provided,* that upon the acquisition of title to or lease of any privately-owned island by the United States, or upon the termination of any private right to or appropriation of any public-land island within the area, or upon the acquisition of control by the United States of any island within area, in any other manner, such islands shall be reserved and become part of the refuge….

- This refuge shall be known as the Snake River Migratory Waterfowl Refuge."

- July 27, 1940, Presidential Proclamation No. 2416 (54 Stat. 2720) changed the name of the "Deer Flat Migratory Waterfowl Refuge" to the "Deer Flat National Wildlife Refuge" and changed the name of the "Snake River Migratory Waterfowl Refuge" to the "Snake River National Wildlife Refuge."

- February 20, 1951, MBCC Memorandum Number 9 *Deer Flat National Wildlife Refuge, Canyon County, Idaho*, gave purchase approval for 74.34 acres (Tract 5 for 61 acres from J.B. De Motto and Tract 8 for 13.34 acres, with an easement for electric power line from G.M. Jenkins).

- MBCC Memorandum Number 9 also stated, "The Deer Flat Refuge is an important link in the system of national wildlife refuges in the Pacific Flyway. It is primarily a resting and feeding ground for ducks and geese and a considerable number of geese winter on the area. This refuge will be of even greater importance if proposed power impoundments on the Snake River are completed. Such impoundments will eliminate many small islands in the Snake River that are presently serving as feeding areas for waterfowl. The primary need on this refuge is additional land areas that can be planted to food for waterfowl. There is presented for consideration at this time two tracts of land that can be developed for feeding purposes"

- December 2, 1953, as mitigation for wildlife losses resulting from construction of the C.J. Strike Reservoir, the Idaho Power Company purchased and donated Dilly Island (21.26 acres) to the Service (November 22, 1971, Region 1 Realty Supervisor's memo and January 27, 1964, Service memo to the files).

- January 26, 1955, Public Land Order (PLO) 1060 "Reserving Certain Public Lands As Addition to Deer Flat National Wildlife Refuge" stated "Subject to valid existing rights, the following described public lands in Canyon County, Idaho, are hereby withdrawn from all forms of appropriation under the public land laws, including the mining but not the mineral leasing laws, and reserved as an addition to the Deer Flat National Wildlife Refuge" (adding 280 acres to the Refuge).

- February 15, 1955, MBCC Memorandum Number 8, "Deer Flat National Wildlife Refuge, Canyon County, Idaho," gave purchase approval for Tract 51 (80 acres) from M.H. Leavitt, Canyon County, Idaho. Exceptions were rights-of-way for ditches, tunnels, telephone and power lines, and mineral rights in the State of Idaho. The option for purchase provided for the conveyance of 15 water shares in the Nampa and Meridian Irrigation District, which is sufficient to irrigate 15 acres of land.

- MBCC Memorandum Number 8 stated, "The Deer Flat Refuge is an important link in the system of national wildlife refuges in the Pacific Flyway, and is one of the principal wintering grounds for mallard and Canada geese in that flyway. Between 500,000 and 800,000 ducks and geese winter on this refuge each year. It is the terminus of a distinct flight from the prairie provinces of Canada. The Irrigation District which operates the reservoir draws down the water heavily in the early summer, and a considerable acreage of flats is exposed for the growth of smartweed and the important dwarfish "tealgrass," both of which are of great appeal to geese and other waterfowl as food. Under the refuge management program, the Fish and Wildlife Service has reclaimed substantial part so these flats of a dense, smothering growth of willows which formerly covered the area. The construction of dams on the Snake and other rivers in this area for flood and power purposes has drawn increased numbers of waterfowl to this vicinity, and has created the problem of providing additional food to take care of the flocks and to prevent crop depredation. Also, there is a pressing need for additional marshlands that can be developed and used for nesting purposes…There is presented for consideration at this time a tract of land located immediately east of the existing refuge. This tract consists of both marsh and agricultural land, and its acquisition will increase the effectiveness of the refuge."

- October 21, 1955, PLO 1239 added one tract of 10.25 acres to the refuge stating, "The lands are withdrawn for reclamation purposes by Departmental orders of December 22, 1903 and February 7, 1906."

- March 7, 1958, PLO 1597 "Reserving Lands for Use of the U.S. Fish and Wildlife Service in Connection with Deer Flat National Wildlife Refuge" added 120 acres to the Refuge: "1. Subject to valid existing rights and the provisions of existing withdrawals, the following described public lands in Idaho are hereby withdrawn from all forms of appropriation under public land laws, including the mining but not the mineral leasing laws, or the act of July 31, 1947 (61 Stat. 367: 30 U.S. Code [U.S.C.] 601-604) as amended, and reserved for use of the Service as an addition to the Deer Flat National Wildlife Refuge. 2. The Bureau of Land Management shall continue to administer and dispose of sand, gravel, and other road building material in the NE ¼, SW ¼, Section 26, pursuant to the act of July 31, 1937, supra subject to such provisions as it shall prescribe to insure that the surface of the lands be restored as nearly as possible to their original condition. 3. This order shall take precedence over but shall not otherwise affect the Department Order of April 2, 1935, establishing Grazing District No. 1."

- April 8, 1963, PLO 3016 "Addition to Deer Flat National Wildlife Refuge" added 26 islands to the refuge (264.41 acres, including a small portion of McCrea Island) on the Idaho side of the Snake River between Homedale and Farewell Bend. "Subject to valid existing rights, all islands owned by the United States within the exterior limits of the following described areas in the Snake River, Idaho, are hereby withdrawn from all forms of appropriation under the public land laws, including the mining laws, and reserved for use of the Bureau of Sport Fisheries and Wildlife."

- April 26, 1963, PLO 3047 added 32 acres to the Lake Lowell Unit of the refuge.

- June 28, 1963, PLO 3110, "Abolishment of Snake River National Wildlife Refuge; Transfer of Lands to Deer Flat National Wildlife Refuge," stated "The Snake River National Wildlife

Refuge, heretofore established by E.O. 7691…is hereby abolished, and the lands now comprising the said refuge are transferred to and consolidated with the Deer Flat National Wildlife Refuge. The lands consist of islands in the Snake River and are located within the following described areas….”

- July 31, 1963, PLO 3168, “Withdrawing Public Lands for Use of the Bureau of Sport Fisheries and Wildlife, an Addition to the Deer Flat National Wildlife Refuge,” added 11 islands in Idaho and part of a twelfth (159.53 acres) on the Oregon side of the Snake River between Homedale and Farewell Bend. The PLO stated, “1. Subject to valid existing rights, all islands owned by the United States within the exterior limits of the following described areas in the Snake River, Idaho, are hereby withdrawn from all forms of appropriation under the public land laws, including the mining laws, and reserved for use of [the Service]…2. Grazing of domestic livestock on the lands shall be in accordance with provisions of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315) as amended, and the regulations in 43 C.F.R. [Code of Federal Regulations], but shall be subordinate to the use of the lands for wildlife purposes.”

- “but shall be subordinate to the use of the lands for wildlife purposes.”

- June 3, 1965, PLO 3661, “Partial Revocation of the Executive Order No. 7655 (Deer Flat National Wildlife Refuge),” added approximately 0.93 acres to the Lake Lowell Unit of the Refuge, stating “The land is acquired.”

- February 12, 1968, PLO 4366, “Addition to Deer Flat National Wildlife Refuge,” added Fields Island (2.91 acres) to the Refuge, located in both Idaho and Oregon. “1. Subject to valid existing rights, the following described lands, are hereby withdrawn from all forms of appropriation under the public land laws, including the mining laws (30 U.S.C., Ch. 2), but not from leasing under the mineral leasing laws, and reserved as an addition to the Deer Flat National Wildlife Refuge… 2. Grazing of domestic livestock on the lands shall be in accordance with provisions of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315) as amended, and the regulations in 43 C.F.R.

- May 28, 1968, PLO 4425, “Addition to Deer Flat National Wildlife Refuge,” added 16.9 acres to the Snake River Islands Unit of the Refuge. “1. Subject to valid existing rights, the following described lands, are hereby withdrawn from all forms of appropriation under the public land laws, including the mining laws (30 U.S.C., Ch. 2), but not from leasing under the mineral leasing laws, and reserved as an addition to the Deer Flat National Wildlife Refuge…. 2. Grazing of domestic livestock on the lands shall be in accordance with provisions of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315) as amended, and the regulations in 43 C.F.R., but shall be subordinate to the use of the lands for wildlife purposes.”

- November 20, 1968, the Bureau of Sport Fisheries and Wildlife signed a memorandum of understanding (MOU) with the City of Marsing, Idaho, allowing the city use of Marsing Island as a park and recreation area; on February 23, 1972, the Bureau reported the island as excess property to the General Services Administration (GSA) and on May 11, 1972, the MOU between the Bureau and the City of Marsing was terminated. On June 21, 1972,

Marsing Island was assigned to the Reclamation by GSA and later deeded to the City of Marsing.

- October 24, 1975, PLO 5545 added 175 acres to the Lake Lowell Unit of the refuge, stating, "Except for any private lands which may be involved, the lands described in paragraph 1. above remain withdrawn from all forms of appropriation under the public land laws, including the mining laws, for the Payette-Boise Reclamation Project."

- On June 26, 2002, a lawsuit with the State of Idaho regarding ownership of islands in the Snake River was settled. The State of Idaho had filed suit on September 15, 1997, claiming title to islands and portions of islands that were part of the Snake River Island Unit of the Refuge. The suit was based on the State's contention that these islands were formed after statehood (July 4, 1890) and, therefore, belonged to the State. The State laid claim to 63 of the islands that were part of the Refuge at the time. In 1936, certain islands in the Snake River had been identified as under Federal or State ownership by Idaho and Service personnel, ownership determinations that were not founded on science. In its defense, the Service contracted various experts to gather data and refute the State's claim. Work was conducted on the geomorphology, soil, and location of the ordinary high water mark. Based on the findings of these scientific investigations, a settlement was negotiated, whereupon, a few islands previously identified as part of the Refuge became State property, and several islands previously thought to be State property became part of the Refuge.

Document continues on next page.

Appendix J. Contributors

J.1 Core Planning Team

The core planning team consists of persons responsible for the preparation and completion of the CCP/EIS. They are the primary strategists, analysts, and writers. To avoid scheduling and logistical conflicts, the core team has a limited number of participants. This CCP is the result of extensive, collaborative, and enthusiastic efforts by the members of the core planning team below.

Name	Title	Organization
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Steve Dunn	Natural Resource Specialist, Middle Snake Field Office	Reclamation
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J.2 Internal Extended Planning Team and Reviewers

In addition to the core planning team, the following FWS staff participated on the extended team. Extended team members provided technical expertise, assisted with data collection, and/or reviewed and provided feedback during drafting of the CCP/EIS.

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Name	Title	Organization
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J.3 External Extended Planning Team and Reviewers

In addition to the core planning team, the following external subject-matter experts participated on the extended team. Extended team members provided technical expertise, assisted with data collection, and reviewed and provided feedback during drafting of the CCP/EIS.

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Paul Deveau	Project Manager	Boise Project Board of Control
Jeff Dillon	Regional Fishery Manager	IDFG
Greg Humphreys	Environmental Protection Specialist	Federal Highways Administration

Name	Title	Organization
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Lynne Koontz	Economist	USGS
Joe Kozfkay	Fisheries Biologist	IDFG
Susan Law	Alternative Transportation Planner	Federal Highways Administration
Philip Milburn	Wildlife Biologist	ODFW
Steve Nadeau	Regional Wildlife Manager	IDFG
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Deb Root	Planner	Canyon County Development Services
Natalie Sexton	Wildlife Biologist (Human Dimensions)	USGS
Rick Ward	Environmental Staff Biologist	IDFG
Craig Wiedmeier	Licensing Supervisor	IDFG

J.4 Involved in Pre-Planning Meetings and Not on Extended Team

The following people participated in wildlife and habitat and/or public use reviews during preplanning and did not subsequently participate on the extended team.

Name	Title	Organization
Paul Bicak	Former Marine Patrol	Canyon County Sheriff's Office
Tom Bicak	Director	Canyon County Parks, Recreation, and Waterways
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Steve Humphries	Biologist	Ducks Unlimited
Lyndell Jackson	Former President	Friends of Deer Flat Wildlife

Name	Title	Organization
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Bruce Zoellick	Fisheries Biologist	BLM

Appendix K. Fire Management Plan

WILDLAND FIRE MANAGEMENT PLAN

DEER FLAT NATIONAL WILDLIFE REFUGE

2009

Prepared by: _____ 12/21/2009
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Southeast Idaho National Wildlife Refuge Complex
Date

Submitted By: _____ 01/26/2010
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Date

Reviewed by _____ 2/16/2010
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Date

Approved: _____ 3/15/10
FOR: Robyn Thorson, Regional Director
Pacific Region, U.S. Fish and Wildlife Service
Date

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1.0 Introduction

This plan is written as an operational guide for managing the wildland fire and prescribed fire programs at Deer Flat National Wildlife Refuge (Refuge) which includes two fire management units (FMU) the Lake Lowell FMU and the Snake River Islands (FMU). It defines levels of protection needed to ensure safety, protect facilities and resources, and to restore and perpetuate natural processes, given current understanding of the complex relationships in natural ecosystems.

The two FMUs were originally two separate wildlife refuges both serving as a refuge and breeding ground for migratory birds and other wildlife until becoming one in 1963. Habitat protection from wildland fire and the use of prescribed fire along with mechanical fuel reduction to manipulate habitat as outlined in this plan will be used to address the needs of wildlife to meet the resource goals and objectives for the refuge.

1.1 Purpose of the Fire Management Plan (FMP)

This plan is written to meet Department and Service requirements that every area with burnable vegetation must have an approved FMP. (620 DM 1.4) It enables the Refuge to meet a Service requirement that Refuges review and/or revise FMPs at a minimum of five-year intervals or when significant land use changes are proposed. (621 FW 2)

The goal of wildland fire management is to plan and implement actions that help accomplish the mission of the National Wildlife Refuge System, which is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Completion of an FMP enables Deer Flat National Wildlife Refuge to consider a full range of appropriate suppression strategies and to conduct prescribed fires; without it, prescribed fires cannot be conducted and only wildfire suppression strategies may be implemented.

This FMP identifies and integrates all wildland fire management and related activities. It defines a program to manage wildland fires and to assure that wildland fire management goals and components are coordinated.

1.2 General Description of Refuge

Deer Flat National Wildlife Refuge is located in Idaho's Treasure Valley along the southwest border of the city of Nampa. The refuge encompasses 11,860 acres in two units: Lake Lowell and the Snake River Islands. These units lie within two states (Idaho and Oregon) and five counties (Canyon, Payette, Owyhee, Washington in Idaho, and Malheur in Oregon). The Snake River Islands Unit, which includes over 100 islands, are spread over 113 miles of river. The islands range in size from less than an acre to over 50 acres, with total acreage of 1,220 acres. The Lake Lowell unit is an overlay of an off-stream Bureau of Reclamation irrigation project.

With the increase in population and the urban development of previously natural areas, the Refuge sees thousands of visitors each year seeking recreation opportunities. The refuge offers boating, fishing, and wildlife viewing among other activities. High visitor use coupled with the flashy fuels found on the Refuge, create added fire management concerns.

A map of the Refuge can be found in Appendix A of this document.

1.3 Significant Values to Protect

Key Critical Values to Protect

- The Refuge is adjacent to three federally listed Communities at Risk, (Nampa, Marsing, Caldwell).
- Air quality is a concern at the Refuge due to its location in the Treasure Valley, which is a non attainment area for ozone and pm.2.5 (Appendix A).
- Appropriate measures will be taken to protect sites with cultural significance during wildland fire suppression efforts. Prescribed fire mechanical fuels reduction planning will include a review of known sites that may be impacted.
- The Refuge stands as an important sanctuary for outdoor enthusiasts and hosts thousands of visitors every year who wish to pursue recreational opportunities such as boating, fishing, and wildlife viewing among other activities.
- Private property with homes and outbuildings surround the Refuge separated only by a road or fence. Refuge facilities and structures also lie scattered near grass and sagebrush fuels which could put them at risk in the event of a fire.
- The Refuge was designated to protect habitat for migratory birds along the Pacific Flyway. Much of the native habitats found on the Refuge are not fire tolerant. High intensity fires could result in the loss of important habitat for waterfowl, upland birds, and song birds.
- Eagle nesting/roosting areas along the lake need to be protected from unplanned wildfire.
- Water quality issues affecting Lake Lowell from any potential wildfire will be mitigated.

2.0 Policy, Land Management Planning, and Partnerships

2.1 Implementation of Fire Policy

Specific planning documents, legislation, organizations and associated policies provide guidance for fire management actions described in this FMP are summarized below.

2.1.1 Federal Interagency Wildland Fire Policy

This FMP implements these guiding principles of federal wildland fire policy:

- Firefighter and public safety is the first priority in every fire management activity.
- The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the planning process. Federal agency land and resource management plans set the objectives for the use and desired future condition of the various public lands.
- Fire management plans, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives,
- Fire management plans and activities are based upon the best available science.
- Fire management plans and activities incorporate public health and environmental quality considerations.

- Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.
- Standardization of policies and procedures among federal agencies is an ongoing objective.

2.1.2 National Fire Plan

This FMP meets the policy and direction criteria in the 2001 National Fire Plan because it emphasizes the following primary goals of the 10 Year Comprehensive Strategy and Cohesive Strategy for Protecting People and Sustaining Natural Resources:

- Improving fire prevention and suppression.
- Reducing hazardous fuels.
- Restoring fire-adapted ecosystems.
- Promoting community assistance.

2.1.3 Department of the Interior (DOI) Fire Policy

This FMP incorporates and adheres to DOI policy stated in 620 DM 1 by giving full consideration to use of wildland fire as a natural process and tool during the land management planning process and by providing for the following:

- Wildland fires, whether on or adjacent to lands administered by the Department, which threaten life, improvements, or are determined to be a threat to natural and cultural resources or improvements under the Department's jurisdiction, will be considered emergencies and their suppression given priority over other Departmental programs.
- Bureaus shall cooperate in the development of interagency preparedness plans to ensure timely recognition of approaching critical wildland fire situations; to establish processes for analyzing situations and establishing priorities, and for implementing appropriate management responses to these situations.
- Bureaus will enforce rules and regulations concerning the unauthorized ignition of wildland fires, and aggressively pursue violations.

2.1.4 U.S. Fish and Wildlife Service Fire Policy

By addressing the range of potential wildland fire occurrences and including a full range of appropriate management responses, this FMP meets FWS wildland fire policy. It is consistent with the FWS Fire Management Handbook and the Interagency Standards for Fire and Fire Aviation Management Operations, which are supplemental policy.

This plan affirms these key elements of FWS fire policy (621 FW 1):

- Firefighter and public safety is the first priority of the wildland fire management program and all associated activities.
- Only trained and qualified leaders and agency administrators will be responsible for, and conduct, wildland fire management duties and operations.
- Trained and certified employees will participate in the wildland fire management program as the situation requires, and non-certified employees will provide needed support as necessary.

- Fire management planning, preparedness, wildfire, and prescribed fire operations, other hazardous fuel operations, monitoring, and research will be conducted on an interagency basis with involvement by all partners to the extent practicable.
- The responsible agency administrator has coordinated, reviewed, and approved this FMP to ensure consistency with approved land management plans, values to be protected, and natural and cultural resource management plans, and that it addresses public health issues related to smoke and air quality.
- Fire, as an ecological process, has been integrated into resource management plans and activities on a landscape scale, across agency boundaries, based upon the best available science.
- Wildland fire is used to meet identified resource management objectives and benefits when appropriate.
- Prescribed fire and other treatment types will be employed whenever they are the appropriate tool to reduce hazardous fuels and the associated risk of wildfire to human life, property, and cultural and natural resources and to manage our lands for habitats as mandated by statute, treaty, and other authorities.
- Appropriate management response will consider firefighter and public safety, cost effectiveness, values to protect, and natural and cultural resource objectives.
- Staff members will work with local cooperators and the public to prevent unauthorized ignition of wildfires on our lands.

2.1.5 Refuge Specific Fire Management Policy

A Comprehensive Conservation Plan has not been completed for the Refuge. Under the National Environmental Policy Act, a categorical exclusion has been prepared and can be found in Appendix C. In compliance with the ESA, an Intra-Service Section 7 consultation was also completed and is on file at the refuge headquarters.

2.2 Land/Resource Management Policy

2.2.1 Land/Resource Planning Docurments

The Deer Flat National Wildlife Refuge operates under the direction of a land management plan that was created in 1995. The Refuge is in the initial planning stages of the Comprehensive Conservation Plan process.

2.2.2 Compliance with Regulatory Acts

Threatened and Endangered Species Compliance

A 2007 Intra-Service Section 7 Biological Evaluation for normal refuge operations including prescribed fire and mechanical fuels reduction projects has been signed by the Refuge Manager; copies are on file at the refuge headquarters.

Cultural Resource Compliance

In order to comply with National Historic Preservation Act of 1966 and Archeological Resources Preservation Act of 1979 regulations, a Request for Cultural Resource Compliance will be completed on a project by project basis and submitted to the regional office. The completed Cultural Resource Compliance documents are on file at refuge headquarters.

NEPA Compliance
A Categorical Exclusion for fire management operations (wildland fire suppression, prescribed fire, and mechanical fuels reduction) was signed by the Refuge Manager and is included in Appendix C of this document. This Categorical Exclusion will be reviewed annually.

2.3.1 Internal Partnerships
FWS Pacific Region Regional Office fire management program determined that all fire management operations in southern Idaho for FWS will be the responsibility of Zone Fire Management Officer currently stationed at the Southeast Idaho National Wildlife Refuge Complex office in Pocatello, Idaho.

Fire Prevention and Education Specialist
The U.S. Fish and Wildlife Service Pacific Northwest Region Refuges Fire Management group and the Branch of Fire Management have a memorandum of understanding (MOU) outlining the jointly funded fire management specialist position. The MOU outlines the responsibilities of both parties related to the position. For the region, the position works as the prevention and education specialist. The Refuge is designated as the official duty station and the Southwest Idaho National Wildlife Refuge Complex Fire Management Officer holds the supervisory responsibility for the position. The signed agreement is located in Appendix F of this plan.

2.3.2 External Partnerships
Deer Flat National Wildlife Refuge participates in multiple external partnerships related to fire management with federal, state, and local agencies and departments. The refuge enters into partnerships and official agreements when there is a mutual benefit to those involved.

BLM Agreement
Due to the lack of a dedicated fire crew stationed at the Refuge, Deer Flat NWR has entered into an intragovernmental agreement with the Boise District Bureau of Land Management. Under the agreement, located in Appendix F of this plan, the BLM will provide wildland fire suppression and dispatch services for lands located within the Refuge. This includes initial attack and preliminary fire investigation. The FWS will pay $2000 to the BLM annually to offset costs.

Local Fire Departments
The Fire Departments of Nampa, Caldwell, Marsing, and Upper Deer Flat border the Refuge and Refuge land falls within their fire protection districts. The Refuge staff is actively pursuing interagency agreements with these departments some of which have existing cooperative agreements with the Bureau of Land Management.

Fire Program Analysis Participation
Deer Flat NWR is a chartered member of the Southwest Idaho Wildland Fire Cooperative Fire Planning Unit formed to support and contribute to the development of landscape scale interagency fire planning and budgeting as directed by national fire policy and the Office of Business Management. Cooperating agencies in the fire planning unit are the Boise and Payette National Forests, Boise District Bureau of

Land Management, Idaho Department of Lands Southwest Idaho Supervisory Area, and Southern Idaho Timber Protective Association.

Idaho State Fire Plan Working Group
The Idaho State Fire Plan Working Group (ISFPWG) is a multi-agency collaborative body charged with assisting counties with their County Wildfire Protection Plans and their associated countywide working groups, dissemination of information, and oversight and prioritization of grant assistance programs in order to facilitate the implementation of the National Fire Plan in Idaho. The Regional Fire Outreach Coordinator housed at the Refuge represents the FWS as a part of this group. They participate in ISFPWG subcommittees as appropriate. Subcommittees include those focused on fire education, restoration, and communication to promote state-wide projects and emphasis items.

County Wildfire Protection Plan
Canyon County has developed a County Wildfire Protection Plan (CWPP) that identifies potential fuel reduction opportunities in the area. As part of Canyon County, Deer Flat NWR is mentioned in the plan. The CWPP is posted at this website Idaho Department of Lands CWPP.

Treasure Valley Fire Prevention and Safety Cooperative
Deer Flat NWR is an active member of the Treasure Valley Fire Prevention and Safety Cooperative partnering with the Boise National Forest, Boise District Bureau of Land Management, Idaho Department of Lands, State Fire Marshal's Office, and the city fire departments of Caldwell, Nampa, Meridian, and Boise. The mission of the Cooperative is to promote an interagency exchange of ideas and resources to deliver consistent messages to the public about fire education topics.

Bureau of Reclamation
A memorandum of understanding (MOU) exists between the Refuge and the Bureau of Reclamation (BOR) to outline joint responsibilities for the operation and management of the lands and waters within the Lake Lowell Fire Management Unit at the Refuge. This MOU can be found on file at the Refuge headquarters.

3.0 Fire Management Unit Characteristics
A fire management unit (FMU) is an area that shares common objectives, physiological/biological/social characteristics and constraints, that result in desired conditions as stated in land management plans (i.e., CCP, HMP), which set it apart from the characteristics of an adjacent FMU.

Considering fire history and occurrence the wildland fire program complexity at Deer Flat NWR is moderate. The CCP for Deer Flat NWR is currently under development and when completed will further define future desired conditions for the refuge. In the interim this FMP will identify the Lake Lowell area of the Refuge as one FMU and the Snake River Islands as the other FMU.

3.1 Area Wide Management Considerations
The following sections addresses management considerations for the FMUs including fire management objectives, constraints, fuels, fire regime and condition classes, standards, fire potential of major vegetation types, and burned area rehabilitation.

3.1.1 Management Goals, Objectives and Constraints from CCP's and other Planning Documents

The CCP process for Deer Flat NWR is currently in the planning/development phase; management goals and objectives were obtained from draft planning documents. The following general fire management goals and objectives have been developed by refuge staff and regional biologists in the interim.

To the extent practicable, use prescribed fire in conjunction with water management, grazing, mowing, and/or other mechanical manipulations and chemical applications, on emergent wetland, woody riparian, herbaceous upland and/or wet meadow vegetation, in order to provide desirable vegetation species composition and/or structure, including, but not limited to:

Goals

- Maintain and protect lacustrine habitats associated with Lake Lowell.
- Enhance, maintain, and protect riparian forest benefiting migratory birds and other riparian-dependent species.
- Enhance, maintain, and protect wetland habitats for the benefit of migratory birds and other wildlife.
- Enhance, maintain, and protect shrub steppe habitats characteristic of the area.
- Protect agricultural crop areas which provide support to migrating waterfowl and resident wildlife as well as providing fuel breaks.
- Gather scientific information (inventories, monitoring, research, and assessments) to support adaptive management decisions under objectives for Goals 1-6.

Objectives

- Use mechanical, physical, biological, and chemical means to eradicate, control or contain invasive plants, woody species, and shrubs such as Russian olive, salt cedar, and scotch thistle.
- Enhance, maintain, and protect riparian forests through use of prescribed fire, mechanical or chemical treatment.
- Enhance, maintain, and protect emergent wetlands through use of prescribed fire, mechanical or chemical treatment to result in 30-70 percent of a mosaic of desired native emergent vegetation including cattail, bulrushes, sedges, rushes, smartweeds, and wild millet to support a diverse assemblage of wetland-dependent wildlife and birds.
- Enhance, maintain, and protect shrub steppe through use of prescribed fire, mechanical or chemical treatment to create a mosaic of shrubs and herbaceous understory.
- Monitoring activities will be conducted to evaluate achievement of objectives for prescribed fire, mechanical or chemical treatments as appropriate.
- Rehabilitation of burned areas will take place to reduce the infestation of invasive species, to protect water quality, and to restore native sagebrush steppe habitat.

3.1.2 Management Goals, Objectives and Constraints from other Sources

The following operational standards are pertinent to the Refuge, as found in the FWS manual (095 FW 3):

- Manage fire suppression to minimize risks to firefighter and public safety.
- An initial action and an appropriate management response are required for every wildfire on or threatening refuge lands.

- The range of appropriate management responses to wildfires may include direct or indirect attack of high and/or low intensities or surveillance and monitoring to ensure fire spread will be limited to a designated area.
- Reduce and maintain fuels in WUI areas to provide for public and firefighter health and safety.
- Reduce and maintain fuels in non-WUI areas to provide for firefighter health and safety and to protect habitats critical to endangered species, migratory birds, and ecosystem integrity.
- Use prescribed fire as a tool to restore ecosystem integrity and endangered species habitat.
- Prepare and implement an effective fire prevention plan to minimize unwanted fires.
- Investigate all unplanned human-caused fires.
- Retardants and foams will not be used within 300 feet of any waterway.
- Minimize and, where necessary, mitigate human-induced impacts to resources, natural processes, or improvements attributable to wildland fire activities.
- Ground disturbed by suppression activities will be rehabilitated.
- Heavy equipment use will be closely monitored to minimize impacts on cultural resources.
- Heavy equipment use will be closely coordinated with the Refuge Manager or resource advisor to limit habitat damage. Due to soft ground conditions many areas of the refuge are unsuitable to heavy equipment usage.
- Prevent the further spread of invasive plants.
- Maintain close working relationship with interagency partners to accomplish wildland fire suppression and prescribed fire treatments.
- Maintain Intergovernmental Agreements with interagency partners for dispatch services.
- Promote public understanding of refuge fire management programs and objectives.

3.1.2.1 Cost Effectiveness

Maximizing the cost effectiveness of any fire operation is the responsibility of all involved, including those that authorize, direct, or implement those operations. Cost effectiveness is the most economical use of the resources necessary to accomplish project/incident objectives. Accomplishing these objectives safely and efficiently will not be sacrificed for the sole purpose of "cost saving". Care will be taken to ensure that expenditures are commensurate with values to be protected. Many factors outside of the biophysical environment may influence spending decisions, including those of the social, political, and economic realms. The following tools will be used to provide information to make the most cost effective decision possible:

- Employ state-of-the-art decision support tools
- Provide a clear description of Refuge objectives in this Fire management Plan to aid in alternative development
- Through cost-share agreements, distribute the decision process to all parties involved in wildland fire management

3.1.3 Common Characteristics of the Fire Management Units

Climate and Topography

The entire Refuge is influenced by its location in the Snake River Valley. Elevation at the visitor center is about 2,550 feet above sea level with an average rainfall between 8 and 11 inches. During the summer the climate is generally arid with little rainfall between May and October. Temperature extremes can range from minus 25 degrees to 110 degrees Fahrenheit. The growing season averages six months.

Winds tend to follow the orientation of the valleys with an occasional destructive wind blowing due to the passing of a cold front or thunderstorm.

The FMUs share similar topography with rolling sagebrush hills scattered along relative flat areas.

Deer Flat NWR Climate

	Spring	**Summer**	**Fall**
Average Max Temp (F)	65	91	66
Average Min Temp (F)	37	54	36
Average Mean Relative Humidity (%)	50	37	47
Average Min Relative Humidity (%)	26	17	26

Normal Fire Season

Due to the arid conditions of this area, fires can occur almost any month of the year. The majority of the fires have occurred during June to August time frame. Most fires are human-caused due to high visitor use.

Fire History

From 1997 to 2007 the Refuge has experienced 30 wildfires for a total of 320 acres. The majority and largest fires have occurred in the sagebrush steppe habitat with a few occurring in the dense riparian area next to Lake Lowell. The majority of all of the fires recorded on the Refuge have been human-caused. Fire frequency on the Refuge has ranged from 16 fires in one year (1977) to a gap of five years without a fire (from 1951 to 1956). See fire history spreadsheet in Appendix E.

Wildlife Species

The Refuge is a major waterfowl wintering area in southwest Idaho and eastern Oregon. In spring and summer, water is released from Lake Lowell to irrigate surrounding farm fields. This draw-down of the lake exposes mud flats that provide abundant habitat for shorebirds. The lake also produces a bumper crop of aquatic vegetation for birds to feed on, particularly smartweed. In fall, smartweed seeds provide a feast for migratory ducks heading south. In winter, Lake Lowell is home to as many as 150,000 ducks and 15,000 Canada geese, and to the many bald eagles and other raptors attracted to the bounty provided by the large flocks of waterfowl. The refuge also has marsh areas where the water is manipulated to provide feeding, nesting, and resting habitat for mallards, sora rails, yellow-headed blackbirds, and other wildlife.

Habitats surrounding the lake include riparian forest, shrub-steppe uplands, and crops. The riparian forest is predominantly cottonwood, peachleaf willow, and coyote willow. These forested areas provide food, nesting sites, and cover from predators for a variety of tree-dependent species, including a variety of song birds.

Sagebrush, rabbitbrush, and the bunchgrass Great Basin wild rye dominate the uplands near the lake and on the islands. Herbivores like rabbits, gophers, mule deer, and grasshoppers, feed on upland plants and rely on those plants for nesting sites and cover. Approximately 240 acres of refuge land is irrigated cropland managed to provide food and cover for wildlife.

Local farmers grow corn, beans, peas, wheat, and alfalfa. The farmers keep a share of the crop and leave the rest for wildlife. Pheasants, deer, quail and other wildlife feed and nest in these fields. In fall and

winter, local Canada geese, as well as migrant geese and other waterfowl from the north, harvest the abundant food available in refuge fields.

Other species occurring on the refuge include red-tailed hawks, northern harriers, American kestrels, great-horned owls, western screech owls, long-eared owls, and northern saw-whet owls Kestrels, screech owls, and saw-whet owls use wood duck nest boxes extensively for their nesting and winter roosting. The Refuge also has a resident mule deer population. Other refuge resident mammals include red fox, coyote, raccoon, badger, muskrat, fox squirrel, cottontail rabbit, and various small rodents. Beaver use the area along the New York Canal with numerous bank dens but the population is very small. On occasion river otters are sighted on the lake.

The 101 islands of the Snake River FMU are distributed along 113 river miles between the Canyon-Ada County line in Idaho and Farewell Bend in Oregon. The islands provide a variety of habitats, including areas dominated by grasses and sagebrush. The Snake River Islands provide an important nesting habitat for Canada geese, ducks, herons, shorebirds, gulls, cormorants, and various songbirds. The islands are open to public use with the exception of a closure from February 1 to May 31, to protect nesting birds.

No currently listed threatened or endangered species are known to inhabit the Refuge although rare and sensitive species such as Bald Eagles, utilize the refuge. These species can be especially sensitive to disturbance during their nesting seasons.

Water Quality

Migratory birds and the aquatic life that inhabit the Refuge rely on healthy water. Any use of fire suppression chemicals such as foam or fire retardant will comply with the standards outlined in Chapter 12 of the Interagency Standards for Fire and Fire Aviation Operations.

Water quality could also be affected by run-off and sediments which could result from an intense burn on a slope followed by precipitation.

Prescribed Fire & Mechanical History

Prescribed fires have not been conducted at the Refuge in the last 10 years due to concerns with smoke management, proximity to wildland urban interface, and the lack of fire personnel on site. However, 18 mechanical treatments for 1,002 acres have been completed at Deer Flat during the last decade on the Lake Lowell FMU (Appendix E). Treatments include mastication in riparian forests, Russian olive tree removal and chipping, and disking firelines. 11.5 miles of firelines are annually disked to reduce the potential risk of wildfire spreading off of the refuge. The disk lines have been tested during wildfire incidents in the past ten years and have been a key factor during suppression efforts. Mechanical and prescribed burn treatments have been proposed for the Snake River FMU although none have been completed.

Vegetation

The vegetation/habitat for the Refuges is described in the individual FMU characteristics with acreage and percentages. Vegetation types can be generally described as grasslands (FM 1/3), and shrub (FM 2/6), and forest (FM 8/10).

Fuel Model 1: Agricultural field.

Fuel Model 1: Grassland.

Fuel Model 1: Lacustrine emergent.

Fuel Model 2: Sagebrush and grass.

Fuel Model 3: Emergent.

Fuel Model 6: Sagebrush.

Fuel Model 6: Willow.

Fuel Model 10: Cottonwood forest.

Fire Behavior

Fire behavior outputs in the table below were from the BehavePlus 3.0.2 program. In this model, fires are assumed to be spreading as a series of steady state ignitions through uniform fuels under uniform weather conditions. Spread is also assumed to be from surface fire only. The fire behavior outputs are modeled to represent a potential summer fire (July/August). Weather data used in the modeling is 20 year data from the Boise South RAWS station (102601) located at the Boise Airport. Weather inputs to the BehavePlus runs: July, Temp 70-89, RH 11-38, 1-hr fuel moisture/FDFM 2/5%, 10-hr fuel moisture 7%, 100-hr fuel moisture 8%, live herbaceous moisture 78%, live woody moisture 79% wind speed 5/15 mph, time of day 1400, slope 0-5%.

Fire Behavior Outputs by NFFL Fuel Models

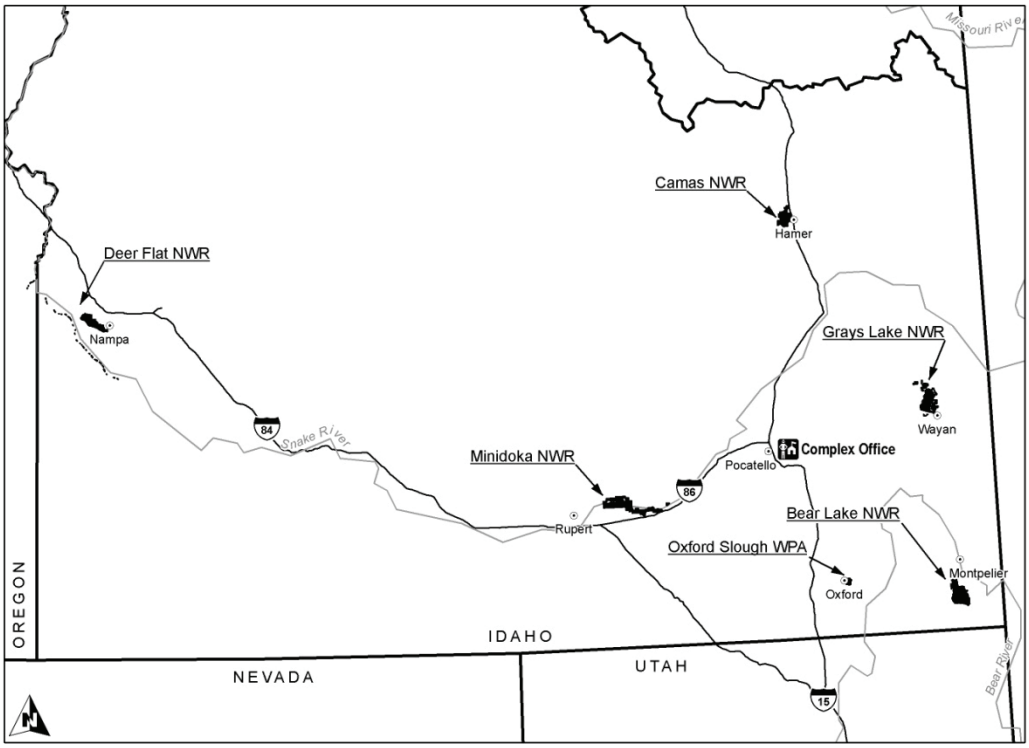
Fuel Model	Rate of Spread (ch/hr)	Flame Length (ft)
1	99-665	4-12
2	34-314	6-18
6	36-207	6-15
8	2-10	1-3
10	10-55	5-13

3.2 Fire Management Units

Fire Management Units (FMUs) are areas which have common wildland fire management objectives and strategies, are manageable units from a wildland fire standpoint, and can be based on natural or manmade fuel breaks. There are two FMUs at Deer Flat NWR.

Fire Management Units

FWS Fire Management Units within the FMP	Total Acres	Burnable Acres
Lake Lowell	10,548	5,039
Snake River Islands	1,220	1,220
Totals	11,768	6,259



3.2 Lake Lowell Fire Management Unit

3.2.1 Lake Lowell FMU Characteristics

Deer Flat National Wildlife Refuge was established in 1909 as a resting and breeding ground for migratory birds and other wildlife with an emphasis on wintering waterfowl. The Lake Lowell FMU is located in the state's largest metropolitan area, the Treasure Valley, which creates a complex situation for fire managers. This FMU lies entirely in Canyon County which has a rich history in farming and agricultural activities. In recent years, population and urbanization are increasing rapidly with agricultural areas being developed throughout the county. County managers anticipate an average annual increase in population of 5.5 percent over the next several years. Much of the Refuge is bordered by private property with homes and outbuildings directly adjacent to refuge land resulting in a wildland urban interface situation raising concerns about managing fire on the Refuge. The potential for a fire to burn off of the Refuge onto private property must be considered during all fire activities at Deer Flat NWR. Four fire departments have jurisdictional responsibility for this private land (AppendixA).

The habitats in the Lake Lowell FMU include wetlands (lacustrine and emergent), cottonwood and willow forests, shrub steppe uplands, and cultivated agricultural areas, (see table below).

Fuel Model Composition Lake Lowell FMU

Vegetation Type	Fuel Model	Acres	Percent
Cultivated Agricultural Land	FM 1	328	2.5%

Lacustrine, Emergent Wetland	FM 1	1,248	12%
Emergent Wetland	FM 3	43	.04%
Cottonwood Forest	FM 8/10	1,131	11%
Willow Forest	FM 6	1,152	11%
Shrub Wetland	FM 6	342	3.2%
Shrub steppe Upland	FM 6	762	7%
Lake Lowell open water		5,480	52%
Administrative sites		62	.05%
Total		**10,548**	100

3.2.2 Lake Lowell FMU Fire Environment

All fire operations in the Lake Lowell FMU must consider the wildland urban interface situation which exists. A thorough safety and risk management analysis must be completed to ensure firefighter and public safety.

With the number of visitors the Refuge gets annually, the presence of the public is almost certain during fire operations. The traffic and other considerations must be considered when making tactical decisions.

Mainly due to the invasion of non-native cheatgrass, the shrub steppe upland vegetation around the Refuge has a history of frequent, fast moving intense fires. The heavy down/dead fuel loading in the Cottonwood Forest surrounding Lake Lowell has posed control and mop-up problems during past wildfire incidents.

Along the shore of the lake, a band of debris or organic layer exists that can complicate mop-up efforts with long term smoldering requiring lots of water to extinguish. The band is affected by the level of the water in the lake. As the lake level goes up the layer of organic matter may be submerged. As the lake level goes down particularly in summer/fall when water levels are low, the band may require consideration.

3.2.3 Lake Lowell FMU Objectives and Constraints

- Due to concerns with the wildland urban interface situation around Lake Lowell, wildfires in this FMU will be aggressively suppressed.
- Hazardous fuels treatments will be applied where appropriate; mechanical treatments will be considered over prescribed burning to limit the smoke impacts to the valley.
- The waterfowl nesting season at the Refuge ranges from mid-April to late summer. Prescribed fire and mechanical fuel reduction treatments will not usually take place during this time to avoid disturbing nesting habitat.
- Downed and standing dead trees will be protected when feasible to provide nesting and foraging habitat for migratory birds.
- Firebreaks, disk lines, or native plant vegetated areas (greenbelts) will be created and/or maintained to mitigate the risk of wildfire moving into areas of concern such as the wildland urban interface or rare and sensitive habitats.
- Prescribed fire, mechanical treatment (disking, moving, etc.), or chemical treatment will be used to set back succession or to remove extensive emergent stands.

3.2.4 Lake Lowell FMU Values to Protect

- High priority will be given to any wildfire on the Refuge threatening private property. The Federally designated Community at Risk of Caldwell, Nampa, and Marsing are adjacent to the Refuge.
- Sagebrush/grassland habitats located on the north side of the Refuge.
- Sensitive areas of the Refuge are the riparian habitat along Lake Lowell.
- Cultural resource sites (documented at refuge headquarters).
- Refuge structures scattered along the north shore of the lake including refuge headquarters, residences, maintenance area, etc.

3.3.1 Snake River Island FMU Characteristics

The Snake River Islands FMU, which includes over 100 islands, is spread over 113 miles of river. The islands range in size from less than an acre to over 50 acres, with total acreage of 1,220 acres. Islands within the Snake River are the primary nesting area of southwest Idaho's "local/resident" Canada goose population. Geese nest on nearly all of the refuge islands.

A wide variety of raptors use the islands throughout the year including American kestrel, great horned owl, long-eared owl, northern harrier, osprey, screech owl, barn owl, saw-whet owl, prairie falcon, red-tailed hawk, and turkey vulture.

Islands in this FMU vary greatly in their vegetative cover. Islands at the upstream end are fairly open in the middle and are dominated by shrubs such as sagebrush and greasewood. Islands in the downstream section are more heavily vegetated with some large stands of cottonwood with an open grassy middle. All of the islands have some willow invasion along their edge depending upon the amount of river washing. Russian olive is also an aggressive invader on many of the islands. A vegetation acreage break down for this FMU is not available, vegetation/fuel models present include FM 1,2,6,8.

3.3.2 Snake River Island FMU Fire Environment

Access to and from any fire operation on one of the Snake River Islands will have to be made by boat or helicopter which could slow response time or make determining a safety zone before approaching the fire critical.

Consideration must also be given to the proximity to the mainland and expected fire behavior. In one known case, a fire has spotted from one of the islands to the mainland near Marsing. Historically, the shore has been sparsely populated with private structures, but development has increased and the number of homes has increased creating more concern should a fire ignite.

3.3.3 Snake River Islands FMU Objectives and Constraints

- The full range of appropriate management response (AMR) will be considered to any unplanned ignition; however, due to island being surrounded by water and access problems the suppression strategy typically will be a limited perimeter control strategy. A more aggressive strategy will be used if the fire spots off the island onto the shore and poses a threat to values to protect.
- Use prescribed fire, mechanical, and/or chemical manipulation to enhance habitat where appropriate.
- Any mechanical or prescribed fire treatment completed will have to be followed up with chemical treatments to limit the spread of invasive vegetation.

- The waterfowl and raptor nesting season at the refuges ranges from mid-April to late summer. Prescribed fire and mechanical fuel reduction treatments will not usually take place during this time to avoid disturbing nesting habitat.
- Downed and standing dead trees will be protected when feasible to provide nesting and foraging habitat for migratory birds.

3.3.4 Snake River Islands FMU Values to Protect

- Habitat for water fowl nesting.
- River bank private property.

4.0 Wildland Fire Operational Guidance

The procedures used to *implement* the fire management plan (FMP) for Deer Flat NWR are covered in this section. Information pertaining to this management is either directly provided or references are cited as to where it may be located.

USF&WS wildland fire management policy states that every wildland fire will be assessed following a decision support process that examines the full range of appropriate management responses (AMR).

This policy also provides that wildland fires may be managed for one or more objectives based on land and resource management plan direction. When two or more wildland fires burn together they will be managed as a single wildland fire and may also be managed for one or more objectives based on land and resource management plan direction as an event moves across the landscape and fuels and weather conditions change.

As stated before, the purpose of fire suppression is to put the fire out in a safe, effective, and efficient manner. Fires are easier and less expensive to suppress when they are contained to small areas on the Complex. Thus, the following procedures will be followed for all wildland fires to ensure optimum resource protection and firefighter safety.

4.1.1 Appropriate Management Response

Evaluation and selection of an appropriate management response to a wildfire will include:

- Consideration of risks to public and firefighter safety.
- Threats to the values to protect.
- Costs of various mitigation strategies and tactics.
- Potential resource benefits.

Wildfires will be staffed or monitored during active burning periods as needed to ensure that appropriate mitigation actions can be made to protect values threatened.

All wildfires will be supervised by a qualified incident commander (IC) whose responsibility is to:

- Assess the fire situation and make a report to dispatch as soon as possible.
- Use guidance in this FMP or a delegation of Authority to determine and implement an appropriate management response.
- Determine organization, resource needs, strategy and tactics.

- Brief incoming and assigned resources on the organization, strategy and tactics, weather and fire behavior, LCES (lookouts, communication, escape routes, and safety zones) and radio frequencies.
- Order resources needed for the AMR through the designated dispatch office.
- Manage the incident until relieved or the incident is under control.

The FMP and a Delegation of Authority can provide a general strategy to an IC, who has discretion to select and implement appropriate tactics within the limits described for the FMU(s), including when and where to use minimum impact suppression tactics (MIST) unless otherwise specified. All resources, including mutual aid resources, will report to the IC (in person or by radio) and receive an assignment prior to tactical deployment.

Critical protection areas, such as refuge headquarters, neighboring residences and ranches, and adjacent private croplands, will receive priority consideration in fire control planning efforts. In all cases, the primary concerns of fire suppression personnel shall be the safety, and if needed, all individuals not involved in the suppression effort may be evacuated.

General AMR Constraints

- Close proximity to private property and residences, (WUI and Communities at Risk).
- Lack of a cultural resource inventory. Limited cultural resource surveys have been completed at the refuge, (completed surveys are on file at the refuge office).
- Soft ground/moist-soil conditions which preclude the use of conventional fire equipment.
- Tracts of continuous vegetation, lack of adequate fire/fuel breaks, and lack of interior and boundary refuge roads.

Interagency Operations

As mentioned in 2.3.2 the Refuge coordinates with the BLM in fire management operations. The Refuge coordinates with this agency for dispatch services through Boise Interagency Logistics Center. Any wildfire AMR actions would be coordinated through the appropriate dispatch centers with neighboring federal agencies.

4.1.2 Preparedness

Deer Flat NWR is not funded for a dedicated fire crew. The Regional Fire Education Specialist is currently stationed at the refuge ½ time and may be available to coordinate initial attack activities. The FWS has an Intragovernmental agreement with Boise BLM for initial attack fire response. The SE Idaho NWRC FMO and Deer Flat NWR Project Leader will meet with federal and local cooperators (BLM and Nampa Fire Department) annually prior to fire season, to review the respective agreements. This may include contact information and fire suppression policies and procedures.

The normal fire season for the refuge was discussed in section 3.1.3; prior to and during fire season the following tasks will be implemented and completed.

- The Complex FMO will work with the Refuge Project Leader to update Delegations of Authority with suppression constraints.
- Fire qualified personnel work with the Complex FMO to schedule annual medical examinations prior to the start of fire season.

- Fire qualified personnel will complete fitness testing, complete the annual refresher, and are issued full personal protective equipment (PPE) prior to the start of fire season.
- Prior to fire season the Refuge step-up plan will be reviewed by the Complex FMO and the Refuge Project Leader; the plan will be implemented during fire season according to daily fire weather forecasts.

Annual Refuge Fire Readiness Activities

Activities – Complete before end of month	J	F	M	A	M	J	J	A	S	O	N	D
Update Interagency Fire Agreements/AOP's		*x*										
Winterize Fire Management Equipment										*x*		
Inventory Fire Engine and Cache			*x*									
Update Delegation of Authority			*x*									
Annual Fire Physical		*x*										
Annual Refresher Training			*x*									
Annual Fitness Testing			*x*									
Review and Update Fire Management Plan				*x*								

Supplies and Equipment
Deer Flat NWR maintains a small fire cache at the shop for use on fires including tools, nomex, pumps, and water handling equipment. Prior to the fire season all refuge fire suppression equipment will be inspected to determine readiness. All equipment will be brought to a duty ready status. Equipment will be checked to ensure the refuge has enough gear to meet the normal unit strength requirements.

Communications
The Refuge utilizes BLM communications systems, including repeaters and radio frequencies for fire operations. The FWS has a radio frequency use MOU with the Idaho State BLM which is included in Appendix F. Canyon County Fire Radio Frequencies are included in Appendix G.

4.1.3 Detection
The fire detection system relies on reports of fires by the public, law enforcement agencies and refuge staff. Regardless of how any fires are discovered they need to be reported to the Refuge Project Leader, Complex FMO, and Boise Dispatch (384-3400) immediately so suppression actions can be started without delay. Information for fire size-up/information to be provided to Boise Dispatch Center can be found in the Initial Attack Size Up document in Appendix G.

4.1.4 Dispatch, Initial Response, and Initial Attack
The Refuge is a cooperator in the response area for the Boise Dispatch Center. Mobilization of fire resources to and from the Refuge is handled through Boise Dispatch.

As stated above (Appendix F), the Boise District Bureau of Land Management will provide primary initial attack services for Deer Flat NWR. Initial attack shall include a determination of fire cause. The Project Leader will coordinate with Boise Dispatch for the need for further fire investigation. The Zone Law Enforcement Officer will also be informed of any suspected human-caused fire.

All fire communications will operate on the assigned frequencies located in Appendix F.

Upon discovery of a fire, all subsequent actions will be based on the following:

- The Project Leader or designee will provide the IC with a Delegation of Authority.
- The Incident Commander (IC) will locate, size-up, and coordinate suppression actions. The IC will start the Incident Organizer to document actions, fire behavior and weather conditions.
- Provide for firefighter and public safety.
- Considering the current and predicted fire conditions, the IC will assess the need for additional suppression resources and estimate the final size of the fire. The potential for spread outside of the refuge should be predicted, as well as the total suppression force required to initiate effective containment action at the beginning of each burning period.
- The IC will assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc. and make the request to the dispatch center.
- Document decisions in the Incident Organizer and provide the FMO a copy after the incident is out.
- Should a wildland fire move into an extended attack the IC will coordinate with the Refuge staff and Boise Dispatch Center to complete a Wildland Fire Decision Support System

4.1.5 Extended Attack and Large Fire Management

The Wildland Fire Decision Support System (WFDSS) process will be used when a wildfire escapes initial attack. The refuge staff will request assistance from the Regional Office fire management staff or BLM partners to prepare the analysis.

Extended attack fires will be managed in accordance with the Interagency Standards for Fire and Aviation Operations (Redbook).

4.1.6 Aviation Operations

Aircraft may be used in all phases of fire management operations. All aircraft must be National Business Center Aviation Management Directorate or Forest Service approved. Air operations at Deer Flat NWR will be coordinated through Boise Dispatch Center and must adhere to all DOI aviation policy.

4.1.7 Reviews and Investigations

Reviews and investigations are used by wildland fire and aviation managers to assess and improve the effectiveness and safety of organizational operations. Brief descriptions of various reviews and associated procedures and requirements, including those for serious wildland fire accidents, entrapments, and fire trespass are listed in the corresponding Red Book chapter.

Incident Commanders and Single Resource Bosses will ensure After Action Reviews (AAR) take place in a timely manner and that any significant issues are brought to the attention of the Complex FMO and Refuge Project Leader.

4.1.9 Reports

The Complex FMO or designee will complete and file an Individual Fire Report (DI-1202) in the FWS Fire Management Information System (FMIS) for the following types of fires within 10 days of a fire being declared out:

- All wildfires on FWS and FWS-protected lands.

- Wildfires threatening our lands on which we take action.
- All escaped prescribed fires. When a fire exceeds and cannot be brought back into prescription, it will be declared a wildfire. A separate new report will be filed to report acres burned by the wildfire from the time of declaration to the time of being declared out.
- All false alarms responded to by Refuge fire staff.

4.2 Hazardous Fuels Management

All prescribed fire treatments on the Refuge will follow guidance outlined in the Interagency Standards for Fire and Fire Aviation Operations (chapter 17) and the Interagency Fire Planning and Implementation Procedures Reference Guide. See 3.1 for specific prescribed fire objectives.

4.2.1 Prescribed Fire program for Hazardous Fuels and Habitats

The overall objective in the use of prescribed fire in refuge resource management will be to reduce hazard fuels and to promote habitat diversity. Refuge staff will carefully analyze the needs of hazardous fuels reduction in each FMU in relation to habitat objectives on the refuge. Variables to be considered in each proposed treatment area include previous treatments, vegetation type, endangered species, and hazardous fuels reduction.

The prescribed fire program activities at the Refuge qualify as categorical exclusions consistent with Departmental NEPA regulations at 43 CFR 46.210, 43 CFR 46.205,and Departmental NEPA procedures at 516 DM 8.

4.2.1.1 Program Overview

Prescribed fire can be a useful tool for restoring and maintaining natural conditions and processes at the Refuge. Research burning may also be conducted when determined to be necessary for accomplishment of research project objectives. The goals of prescribed fire are for hazard fuel reduction and to meet resource management objectives. Specific management needs for the Refuge will be determined annually by the Refuge staff and Complex FMO. Burn objectives, fire frequency rotation, firing methodology, and prescriptions will vary from year to year. Burn plans will be updated to reflect any variations. The Refuge Project Leader will approve prescribed fire plans after review of the plan by the Complex FMO.

Due to the proximity to the wildland urban interface and smoke concerns, no prescribed fire treatments have been implemented at the Refuge in the last 10 years. Prescribed fire can be a viable habitat treatment tool for the refuge if smoke and WUI issues are properly mitigated.

The prescribed burn window for the Refuge is generally late-fall to early-Spring. This can depend on the loading and type of vegetation being burned. Detailed prescribed burn plans will be developed for each planned treatment which will address fuel loading, weather conditions, adjacent properties, and potential smoke concerns. Specific FMU hazardous fuels objectives and history is described in chapter 3.

Some specific objectives for the Refuge program include:

- Conduct a vigorous hazardous fuels reduction program with the highest professional and technological standards
- Identify the hazardous fuels reduction method most appropriate to specific situations and areas
- Efficiently accomplish resource management objectives through the application of prescribed fire, mechanical, and chemical fuel reduction methods

- Continually evaluate the hazardous fuels reduction program to better meet program goals by refining prescriptions treatments and monitoring methods, and by integrating applicable technical and scientific advancements

4.2.1.2 Effect of National and Regional Preparedness Levels

Prescribed fires may be ignited during National Preparedness Level 4 or 5 as specified in the National Interagency Mobilization Guide. The normal prescribed burn window for the Refuge is early spring and late fall; national and regional preparedness levels are low at this time of year.

4.2.1.3 Project Planning

The FMO will coordinate with the Project Leader to identify high priority fuels treatment projects. All prescribed fire treatments on the Refuge will follow guidance outlined in the Interagency Fire Planning and Implementation Procedures Reference Guide.

All prescribed fires will have prescribed burn plans. The prescribed burn plan is a site specific action plan describing the purpose, objectives, prescription, and operational procedures needed to prepare and safely conduct the burn. The treatment area, objectives, constraints, and alternatives will be clearly outlined. The required burn plan elements are outlined in the Interagency Fire Planning and Implementation Procedures Reference Guide and will be included in all Refuge burn plans.

The Prescribed Fire Plan Preparer will conduct a field reconnaissance of the proposed burn location with the Project Leader to discuss objectives, special concerns, and gather all necessary information to write the burn plan.

Every Prescribed Fire Plan must receive a technical review. The Technical Reviewer and Prescribed Fire Plan Preparer must be qualified or have been previously qualified as a Prescribed Fire Burn Boss at an experience level equal to or higher than the complexity being reviewed. The Technical Reviewer must be someone other than the primary preparer of the plan. An off-unit technical review is encouraged to provide an additional independent perspective. It is acceptable for other specialists to review certain portions of the plan however; a primary Technical Reviewer must be designated as technical review signatory. Either the Prescribed Fire Plan Preparer or Technical Reviewer must be currently qualified, less physical fitness requirement.

The Project Leader has final approval authority for all Prescribed Fire Plans, unless special circumstances warrant higher review and concurrence (such as may occur during higher Preparedness Levels or for extremely large, complex projects). Although the Project Leader has final approval authority for the Prescribed Fire Plan and the "GO/NO-GO" checklist, the Prescribed Fire Burn Boss has the responsibility to make the on-site tactical decisions to safely complete the project. The Prescribed Fire Burn Boss ensures that all prescription, staffing, equipment, and other plan specifications are met before, during, and after the prescribed fire.

4.2.1.4 Project Implementation

Execution of prescribed burns will only be undertaken by qualified personnel. The Prescribed Burn Boss will fill all required positions to conduct the burn with qualified personnel. All personnel listed in the burn plan must be available for the duration of the burn or the burn will not be initiated.

Weather information from the National Weather Service, RAWS station, and other local weather stations will be monitored by the burn boss the week before planned ignition to determine if suitable conditions exist for project completion. A spot weather forecast will be requested, (via the internet) from the Boise NWS office for each day of planned ignition. The burn boss or designee will monitor onsite weather every 2 hour during unit ignition.

When all prescription criteria are within the acceptable range, the Prescribed Burn Boss will select an ignition time based on current and predicted weather forecasts. The Burn Boss will
Ensure that the Agency Administrator GO/NO-GO Checklist is valid and complete and sign the Prescribed Fire GO/NO-GO Checklist the morning of planned ignition.

A thorough briefing will be given by the Prescribed Burn Boss and specific assignments and placement of personnel will be discussed, (using briefing outline in Prescribed Fire Plan). A spot weather forecast will be obtained on the day of ignition and all prescription elements will be rechecked to determine if all elements are still within the approved ranges. If all prescription elements are met, a test fire will be ignited to determine on-site fire behavior conditions as affected by current weather. If conditions are not satisfactory, the test fire will be suppressed and the burn will be rescheduled. If conditions are satisfactory the burn will continue as planned.

A prescribed fire must be declared a wildfire by those identified in the burn plan when that person(s) determines that the contingency actions have failed or are likely to fail and cannot be mitigated. An escaped prescribed fire must be declared a wildfire when the fire has spread outside the project boundary, or is likely to do so, and cannot be contained by the end of the next burning period. A prescribed fire can be converted to a wildfire for reasons other than an escape. An appropriate management response will be made to such incidents and a formal analysis (WFDSS) undertaken when needed. The Project Leader will be notified of an escaped prescribed fire.

The public will be informed of upcoming planned prescribed fires through press releases in local newspapers. Neighbors to the refuge will be called and local law enforcement agencies and fire departments will be call and informed of the burn before planned ignition. Notification calls will be documented and saved in the Prescribed Plan file.

4.2.1.5 Smoke Management

The US Fish and Wildlife Service in south Idaho participates in the Montana/Idaho Airshed Group. The group members include all of the federal agencies, state land management agencies, and private forest products companies. The intent of the Airshed Group is to limit negative impacts from prescribed burns through scientific monitoring of weather conditions and formal coordination of burns.

Prior to the burn season the Fire Management Officer submits a list of planned burn projects to the Missoula Monitoring Unit via internet. This information creates a data base describing the type of burn, number of acres in each unit, and unit location and elevation. Each burn unit is assigned an identification number. The day before the planned ignition, the burn boss accesses the internet data base to submit a proposed prescribed burn for the following day. The program coordinator and a meteorologist provide timely restriction messages for airsheds with planned burning.

The Missoula Monitoring Unit issues daily decisions which can restrict burning when atmospheric conditions are not conducive to good smoke dispersion. Restrictions may be directed by airshed, elevation or by special impact zones around populated areas. The burn boss will access the daily decision

notice from the monitoring unit via the internet. Prescribed burn projects will not be conducted if the Missoula Monitoring Unit posts a burning restriction for the airshed in which the refuge is located.

Deer Flat NWR is located in the Treasure Valley which is a non-attainment area for air quality, (Ozone and PM 2.5). Any prescribed fire treatments conducted will take special consideration for the non-attainment area. Critical and other smoke sensitive areas will be addressed with more detail in each burn plan. See Non-Attainment Map in Appendix A.

4.2.1.6 After Action and Escaped Fire Reviews

The Burn Boss will ensure an informal After Action Review (AAR) is conducted for each operational period on a prescribed fire.

All prescribed fires declared a wildfire will have an investigative review initiated by the Project Leader. The level and scope of the review will be determined by policy and procedures of the Interagency Standards for Fire and Aviation Operations and the FWS Fire Management Handbook.

4.2.1.7 Reports

Burn plans will specify information to be included in a project file. The Burn Boss will ensure this information is provided to the Project Leader and/or Zone Fire Management Officer as specified. This includes documenting conditions and fire behavior during the prescribed fire to assess how well actual fire characteristics fit those predicted, documenting any unanticipated difficulties encountered during implementation, and assessing how well the fire accomplished the intended objectives.

The Burn Boss will complete an Individual Fire Report (DI-1202) with the Complex FMO, who will file an Individual Fire Report (DI-1202) electronically within 10 days of it being declared out. The Complex FMO or assistant will also complete a prescribed fire critique and FFI monitoring report within one month of project completion.

4.2.2 Non-Fire Hazardous Fuels Treatment Program

Non-fire treatment strategies are those that do not involve the use of prescribed fire to meet stated objectives. For the Refuge, mechanical and chemical treatment strategies are available as non-fire management tools. The following objectives for non-fire treatments of hazardous fuels at the Refuge include:

- Establish defensible space along wildland-urban interface boundary and around Refuge improvements and structures.
- Protect habitat from wildfire trespass.
- Restore early successional habitats to promote native species while minimizing invasive species encroachment.
- Maintain fuel loadings within natural ranges of variability for major vegetation types.
- Aid in control of invasive plants and weeds that contribute to the fuel hazard.

Any work requiring heavy equipment, such as mowing, hydro-axe work, fuel break construction, or vegetation removal, should be done with low ground-pressure vehicles to the extent possible when the site is dry enough to prevent damage to soils. Non-fire treatments may be restricted during the nesting season from mid May to early August in areas that provide important habitat for trust wildlife resources.

The Refuge has an active program of mowing and disking fire breaks along the refuge boundary. Fire breaks are mowed/disked generally in late spring to early summer, (see Appendix A for disk line map).

4.2.3 Process to Identify Hazardous Fuels Treatments

The development of prescribed fire and non-fire hazardous fuel management priorities will be an ongoing process determined annually between the refuge staff and Project Leader based on changing habitat conditions on the Refuge, changes in management objectives, and changes in management techniques or new information. The Complex FMO and Refuge staff will coordinate with federal and state partners and review existing County Wildfire Protection Plans (CWPP) when developing potential hazardous fuels treatments in WUI areas.

4.3 Emergency Stabilization and Rehabilitation

Emergency stabilization (ES) and burned area rehabilitation (BAR) are part of a holistic approach to addressing post wildfire issues which also includes suppression activity damage repair and long-term (>3 years) restoration.

ES is planned actions performed by burned area emergency response (BAER) teams within one year of wildfire containment to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources.

BAR is efforts undertaken within three years of wildfire containment to repair or improve fire-damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by fire. The process concludes with long-term restoration.

The incident management team, local fire resources, or refuge staff begins the process by repairing suppression activity damage. These actions are charged to the fire suppression accounting code. Fire suppression activity damage rehabilitation involves short-term actions to repair and rehabilitate damage to lands, resources, and facilities caused by the wildland fire suppression effort or activities. This includes dozer lines, camps, and staging areas; damaged facilities (fences, buildings, bridges, etc.); handlines; roads; etc. The Project Leader should ensure this work is complete before incident demobilization, or as soon thereafter as possible or practicable. Damage caused by backfires and burnouts to stop fire spread falls under fire damage restoration and does not qualify as damage caused by suppression action.

The Project Leader will coordinate with the Incident Commander, Complex FMO, and Regional Office fire staff to determine if an ES or BAR plan is needed for a Wildland fire incident. The Project Leader will form an interdisciplinary team which could include fire and resource specialists to develop and write the ESR Plan. The ES or BAR plans must include provisions for monitoring and evaluation of treatments and techniques, and a procedure for collecting, archiving, and disseminating results. For multi-agency fires, we will do joint planning and implementation. Plans must ensure that the treatments proposed are environmentally, culturally, and socially acceptable, and comply with legal requirements. Each ES or BAR Plan will include a cost/risk analysis of proposed emergency rehabilitation treatment actions to assist agency administrators and reviewing authorities in assessing the proposed actions. The level and sophistication of the analysis should be commensurate with the scope and complexity of the plan.

ES plans should be submitted to the Regional Fire Management Coordinator (RFMC) within 7 calendar days of the wildfire containment. If additional time is needed, extensions may be negotiated with the (RFMC). BAR plans must be submitted before the end of the fiscal year in which the wildfire fire occurs.

Additional ES and BAR guidance may be found in the FWS Directives (095 FW3) and the Interagency Burned Area Emergency Response Guidebook.

4.4 Prevention, Mitigation, and Education

The fire education program for the Refuge will include fire prevention, mitigation, and information specific to the ecological aspects of fire and its interaction with refuge habitats. The program will be aimed at increasing public understanding of the complexities of the overall fire program and will seek to influence attitudes and behavior of adults and children. Attention will be given to social groups, elected officials, schools, and all other interested parties of any age.

Fire education messages will include how and why fire burns the way it does and the effects – both negative and positive – that fire has on plant, wildlife, and human populations. Focus will be given to the effect fuel, weather, and topography have on fire behavior clearly demonstrating the effect manipulation of fuels can have on the opportunity for a fire to burn through a given area.

All education efforts will be consistent with approved Service national and regional messaging. These efforts will be interagency when appropriate.

The fire prevention goal for the Refuge will be to prevent unwanted human-caused fires. High visitor use due to close proximity to large population areas increases the likelihood of careless human ignitions. Although campfires are not allowed on the Refuge, abandoned campfires are one of the concerns to be addressed in fire prevention efforts. Debris burning on neighboring private land, smoking, and fires ignited from vehicles also share some concern and will be addressed in conjunction with other agencies to protect human life and property, natural resources, and prevent damage to cultural resources or physical facilities.

During the typical fire season prevention efforts will be elevated commensurate with fire danger. Refuge employees must be kept informed about changes in the fire situation. Visitor contacts, signing, handouts and interpretive programs may be utilized to increase visitor and neighbor awareness of fire hazards. Due to lack of staffing on the Refuge, collaboration with interagency partners such as local fire departments, the Bureau of Land Management, the Forest Service, and the Idaho Department of Lands is critical for maintaining a fire prevention presence with the public. The Refuge will support interagency fire prevention efforts through use of severity funding, increased personnel presence, large scale campaigns, etc.

During periods of extreme or prolonged fire danger emergency restrictions regarding refuge operations or area closures may become necessary. Such restrictions will usually be consistent with those implemented by cooperators as outlined in the Southern Idaho Fire Restrictions and Closures Guide. The Complex FMO will recommend when such restrictions may be necessary. Closures will be authorized by the Project Leader in consultation with the Complex FMO.

The Refuge is bordered by private property which could be at risk to wildfire should one start on the refuge. Light fuels such as cheatgrass in some areas near private property elevate the risk of rapid fire spread. These areas will be addressed in (CWPP) and treated by chemical, mechanical or prescribed fire means as appropriate to reduce the risk. Refuge personnel will work with interagency partners to educate the community on fire mitigation techniques, consequences of doing or not doing the prescribed treatment, and issues related to any resulting smoke. A message of personal responsibility and Firewise principles will be included in any public contacts regarding fire mitigation.

Fire Investigation
Fire management personnel will attempt to locate and protect the probable point of origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene and report findings to the fireline supervisor.

Prompt and efficient investigation of all suspicious fires will be carried out. However, fire management personnel should not question suspects or pursue the fire investigation unless they are currently law enforcement commission qualified.

Personnel and services of other agencies may be utilized to investigate wildland fire arson or fire incidents involving structures. All fire investigations should follow the guidelines outlined in 4.1-2 of the Fire Management Handbook (2000).

For fires of suspicious origin the IC or Project Leader may request a Fire Investigator through Boise Dispatch.

Public Information and Education
Educating the public on the value of fire as a natural process and as an effective tool to reduce risk to communities and resources from wildfire is important to increasing public understanding and support for the fire management program. The Refuge will use the most appropriate and effective means to explain the overall fire and smoke management program as well as other mitigation techniques such as mechanical and chemical treatments. This may include supplemental handouts, signs, personal contacts, auto tour routes, or media releases. When possible, interpretive presentations will address the fire management program and explain the role of fire in the environment.

The public will be notified of planned prescribed burning in advance of any actions via news releases and direct phone contact to neighboring residences. The role of wildland fire and prescribed fire may be incorporated into presentations that are given to various user groups and visiting public.

5. Monitoring and Evaluation
Monitoring and evaluation are part of the Refuge fire management program. They provide the means by which Refuge personnel are able to determine if applicable sections of the fire management plan are being implemented as planned and if fire-related goals and objectives are being achieved.

5.1 Fire Management Plan

5.1.1 Annual Fire Management Plan Review
This FMP will be reviewed annually and updated as needed, upon local agency administrator approval. Revisions of FMPs with Regional review and concurrence are required every five years and following completion of a new (or significantly revised) CCP or habitat management plan.

5.1.2 Fire Management Plan Terminology
Terms in the FMP are defined in the National Wildfire Coordinating Group Glossary, located at http://www.nwcg.gov/pms/pubs/glossary. Any terms used not in the glossary are defined below.

5.2 Treatment Effectiveness

Basic monitoring to determine habitat response will generally use photo-points, which will be re-visited and photographed during subsequent seasons. Comparisons over time will aid in determining if burn objectives and resource objectives are being met. More complex monitoring efforts may be undertaken for research-related prescribed burns, or to answer questions about the effects of prescribed fire on specific wildlife or other habitat parameters. Such monitoring can require vegetation transects, breeding bird point counts, presence/absence of target species, etc. An excellent reference resource for monitoring procedures can be found within the Fire Monitoring Handbook, USDI, and National Park Service, 2007.

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Appendix B: Refuge Staff Fire Contact List
Appendix C: Categorical Exclusion for Fire Management Operations
Appendix D: Deer Flat NWR Climate Charts and Graphs
Appendix E: Prescribed and Wildfire History
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Appendix I: Radio Frequency List
Appendix J: Step-up Plan
Appendix K: Updates

Appendices A-J are available at request from the Refuge.

Appendix K: Annual Updates

FWS REVIEW CHECKLIST (LONG FORM)
FOR
DEER FLAT NATIONAL WILDLIFE REFUGE
FIRE MANAGEMENT PLANS

Name of Plan Reviewed for Annual Update Process: Deer Flat National Wildlife Refuge	Review Date: 4/16/2012
Refuge or Unit Name (Include Complex if applicable): Deer Flat National Wildlife Refuge	
Fire Staff Reviewer(s) Name and Phone Number: Lance Roberts, 208-237-6615 ext.107	Fire Staff Reviewer(s) Signature (for review approval):
Refuge Reviewer(s) Name and Phone Number: Jennifer Brown-Scott, 208-467-9278	Refuge Reviewer(s) Signature (for review approval):
Amendment Completed and attached to Plan	Date:
Review information sent to Regional Office	Date:
Review date entered in Database (Regional Office)	Date:

Please review the Fire Management Plan (FMP) and complete the columns as follows: A check-mark in the "No Update" column means that this portion of your FMP has been reviewed and determined not to need an update; if a row requires an update (answering yes to the question (s)), check the "Update Needed" column and provide an explanation of the changes in the "Notes/Comments" section. This information will be included in the amendment (including chapter, section and comments) to be attached to the plan annually following the review. Be sure to adequately describe the changes so they are easily understandable to the outside reader. Put an N/A in the "No Update" column for lines that do not pertain to your refuge/unit to make it easier for future reviewers to complete the annual review process.

If the reviewers determine that the changes are substantial and the original intent of the document is compromised, then a revision of the document should be completed. The review discussion between the line officer and the fire staff may support that conclusion but the responsibility for making this decision rests with the unit line officer.

If the reviewers determine that the changes are substantial and the original intent of the document is compromised, then a revision of the document should be completed. This responsibility for making this decision rests at the Unit Line Officer level.

No Update or N/A	Update Needed	Section	Title – Content	Notes/Comments	Date
		Chapter 1. Introduction			
X		1.1	Purpose of the Fire Management Plan		
X		1.2	General Description Of Refuge		
X		1.3	Significant values to Protect		
		Chapter 2. Policy, Land Management Planning, and Partnerships			
		2.1	**Fire Policy**		
X		2.1.1	Federal Interagency Policy change?		
X			• Terminology changes?		
X		2.1.3	DOI policy change? (e.g., Departmental manuals).		
X		2.1.4	Service policy change?		
X		2.1.5	Regional/unit-specific policy change?		
		2.2	**Land/Resource Management Planning**		
		2.2.1	Planning Documents:		
X			• Does Habitat Management Plan (HMP) align with FMP at unit? Is it being revised? Does management wan HMP and FMP revisions to take place simultaneously?		
X			• Is the Comprehensive Conservation Plan (CCP) currently being developed? Revised?	CCP date:	
			• Others: (list) •		
X		**2.2.2**	Environmental Compliance – are your compliance documents up to date in the following areas?		
X			• National Environmental Policy Act (NEPA)	What type? Categorical Exclusion	
X			• Endangered Species Act (ESA)	Date of consultation:	
X			• National Historic Preservation Act (NHPA)		
X			• Archaeological Resources Protection Act (ARPA)		
			• Others: (list) •		
		2.3	**Partnerships**		
		2.3.1	Internal Partnerships changes? (Use spaces below to add new partnerships)		
	X		• Fire Prevention and Education Specialist	This position is no longer filled.	
			•		
		2.3.2	External Partnerships changes?		
	X		• Boise BLM fire assistance agreement	New Intergovernmental agreement signed and 2012 Annual Operating Plan attached	
	X		• Local Fire Departments	The refuge has a Cooperative Fire Protection Agreement with the Nampa Fire Department	
	X		• Idaho State Fire Plan Working Group	The Fire Prevention and Education Specialist is vacant and will not be filled, no FWS representation currently on this group.	
	X		• Treasure Valley Fire Protection and Safety Cooperative	The Fire Prevention and Education Specialist is vacant and will not be filled, no FWS representation currently on this group.	
		Chapter 3. Fire Management Unit Characteristics			
		3.1	**FMP-wide Management Considerations**		

No Update or N/A	Update Needed	Section	Title – Content	Notes/Comments	Date
X		3.1.1	Management Goals, Objectives and Constraints from CCPs and other planning documents.		
X		3.1.2	Management Goals, Objectives, and Constraints from other Sources.		
X		3.1.3	Common Characteristics of the FMUs		
			•		
		3.2	**Fire Management Units**		
X		3.2.1	Lake Lowell FMU Characteristics		
X		3.2.2	Lake Lowell FMU Fire Environment		
X		3.2.3	Lake Lowell FMU Objectives and Constraints		
X		3.2.4	Lake Lowell FMU Values to Protect		
X		3.3.1	Snake River Island FMU Characteristics		
X		3.3.2	Snake River Island FMU Fire Environment		
X		3.3.3	Snake River Island FMU Objectives and Constraints		
X		3.3.4	Snake River Island FMU Values to Protect		
		Chapter 4. Wildland Fire Operational Guidance			
		4.1	**Management of Unplanned Ignitions**		
X		4.1.1	Appropriate Management Response		
	X	4.1.2	Preparedness	The Fire Prevention and Education Specialist is vacant and will not be filled, currently no fire qualified personnel are stationed at the Refuge.	
X		4.1.3	Fire Detection		
X		4.1.4	Dispatch, initial Response and Initial Attack		
X		4.1.5	Extended Attack and Large Fire Management		
X		4.1.6	Aviation Operations		
X		4.1.7	Reviews and Investigations		
X		4.1.8	Reports		
		4.2	**Hazardous Fuels Management**		
X		4.2.1	Prescribed Fire Program for Hazardous Fuels and Habitats		
X		4.2.1.1	Program Overview		
X		4.2.1.2	Effect of National and Regional Preparedness Levels		
X		4.2.1.3	Project Planning		
X		4.2.1.4	Project Implementation		
	X	4.2.1.5	Smoke Management	Updated to include FWS directives regarding clean air/prescribed fire and current Airshed Group operation language.	
X		4.2.1.6	After Action and Escaped Fire Reviews		
X		4.2.1.7	Reports		
X		4.2.2	Non-fire Hazardous Fuels Treatment Program		
X		4.2.3	Process to Identify Hazardous Fuels Treatments		
X		4.3	Emergency Stabilization and Rehabilitation		
X		4.4	Prevention, Mitigation and Education		
X		5.0	Monitoring and Evaluation		
X		5.1	Fire Management Plan		

No Update or N/A	Update Needed	Section	Title – Content	Notes/Comments	Date
X		5.1.1	Annual FMP Review		
X		5.1.2	Fire Management Plan Terminology		
X		5.2	Treatment Effectiveness		
		Appendices			
	X	A	Maps	Updated maps	
	X	B	Refuge Staff Fire Contact List	Updated	
X		C	Categorical Exclusion for Fire Management Operations		
X		D	Deer Flat NWR Climate Charts and Graphs		
X		E	Prescribed and Wildfire History		
	X	F	Interagency Agreements & Delegations	Updated	
	X	G	Initial Attack Fire Size Up	Updated	
X		H	Behave Plus Runs		
	X	I	Radio Frequency List	Updated	
	X	J	Step-up Plan	Updated	
		K	FMP Review Checklist	Added for 2012	

Appendix L. Lake Lowell Recreation Data

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Deer Flat National Wildlife Refuge—Lake Lowell Water Based Recreation Data Summary

By Rudy M. Schuster

U.S. Department of the Interior
U.S. Geological Survey

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Deer Flat National Wildlife Refuge—Lake Lowell Visitor Use Data Summary

By Rudy M. Schuster

Introduction

Established in 1909, Deer Flat National Wildlife Refuge is one of the oldest refuges in the National Wildlife Refuge System. The Refuge has two units, Lake Lowell and the Snake River Islands. The Lake Lowell Unit is 10,636 acres and includes the almost 9,000-acre Lake Lowell and surrounding lands. The Refuge offers the six priority wildlife-dependent activities (fishing, hunting, wildlife observation, wildlife interpretation, wildlife photography and environmental education) as defined in The National Wildlife Refuge System Administration Act as amended by the Refuge System Improvement Act of 1997 as well as other non-wildlife-dependent activities. The purpose of this study is to describe use characteristics of recreational boaters on Lake Lowell. This study does not address use in other parts of the Refuge or other recreational activities.

The sampling and data collection consisted of observations of boat activity made from fixed vantage points on the west and east pools of Lake Lowell to develop vessels-at-one-time (VAOT) estimates for three areas: the West Pool, the Headquarters section of the East Pool, and the East section of the East Pool. A complete description of the sampling locations and a map are provided below.

Traffic counters were also used to collect data on the number of vehicles entering the parking lots. Data were collected between April 15 and September 30, 2011.

Sampling Methods: Lake Lowell

Boater Observation Data Collection Methods

Observers were located on-shore at three vantage points (see Figure 1) that provided a view of activity on the Lake. The observers collected data in 20 minute intervals (three times an hour). Based on the sampling blocks (described below), there was a maximum of 10 observation periods when vessels were counted per sampling day, per observer. Boat activity was recorded the first time the boat was observed during the 20 minute observation period. However, any individual boat could be counted again at the next observation period. Thus, each observation is a stand-alone VAOT estimate for that observation period. The following data was collected at each observation period: time of day, type of vessel, and vessel size, activity, and speed. Compliance with the no-wake postings were recorded within the no-wake portion of the East section of the East Pool only since neither the Headquarters section of the East Pool or the West Pool have large no-wake zones. Data were collected on a field data sheet. Following each survey, weather conditions, average wind speed, average temperature, and water surface conditions were also recorded to summarize the conditions during the survey period. A copy of the boater observation data collection sheet can be found in Appendix 1. The observation categories are listed in Table 1.

Table 1. Categories for variables on observation collection sheet

Variable	**Categories**							
Vessel Type	Motorboat	Pontoon boat	Human powered	Sail boat	Personal watercraft	Kite board	Wind surfer	Other

Speed	Idle	Slow	Plowing	Cruising	Planing	Under Sail	Paddling
Activity	Travel	Milling	Skiing & Tubing	Fishing	Recreation-other		
Size	Less than 16 feet	16 to 25 feet	26 to 39 feet				

Travel was defined as a vessel moving through the survey area in a single direction from one point to another. Milling was assigned to vessels transitioning through the survey area in several directions (greater than two headings) with no apparent destination. Vessels classified as ski/tubing or fishing included only those that were actively engaged in those activities. The mere observation of fishing poles, skis, wakeboards, inner tubes, or other recreational equipment on a vessel did not result in an activity being classified as fishing or ski/tubing. Vessels classified as recreational included wind surfers and kite boarders, or vessels anchored with people swimming nearby or picnicking and not fishing and/or observing wildlife.

Speed classifications were qualitatively determined for each vessel pass observed in the survey area based largely on Gorzelany (2005). Speed classifications assigned to vessels under power included Idle, Slow, Plowing, Cruising, and Planing. Wind powered (i.e. under sail) and human powered (i.e. oar/paddle) speeds were recorded as applicable following the same criteria listed below. Speed classifications were defined as follows:

- Idle Speed – The minimum speed that maintains steerage of a vessel, or the speed at which a vessel is normally docked. Little or no displacement of water is observable from either the bow or stern, and the vessel remains level in the water at all times. This speed is estimated at approximately one to three miles per hour.
- Slow Speed – The speed at which all vessels are completely off plane and fully settled in the water. Some minimal water displacement at either the bow or stern (or both) may be observed. This speed is estimated at approximately five to seven miles per hour.

- Plowing Speed – An intermediate speed between cruising speed and slow speed. The bow of the vessel typically rides higher than the stern, and substantial displacement of water occurs. Depending on the size and type of vessel, plowing may occur at a variety of speeds. This speed designation is used specifically for vessels with planing-type hulls. For the purpose of this study, Plowing Speed is estimated at approximately eight to 10 miles per hour.
- Cruising Speed – A qualitative speed designation uniquely applied to a relatively fast moving vessel with a non-planing type hull (i.e. a pontoon boat or displacement hull vessel). This speed classification is identified by noticeable water displacement from the bow and/or stern and an observed speed faster than the previously defined speed classifications. Vessels at Cruising Speed are estimated to travel at speeds between 11 and 20 miles per hour.
- Planing Speed - A vessel traveling at sufficient speed to partially raise the bow out of the water. The majority of planing vessels are estimated to travel at speeds in excess of 15mph, however vessel planing speeds vary widely depending on vessel size and hull design.

Vessel speed was qualitatively determined and is therefore subject to individual observer interpretation. Physical and environmental factors, including wind speed/direction, may affect vessel speed as well as the degree of water displacement from the bow and/or stern. Observers were instructed to consider these factors and request the opinion of their fellow observer (when possible) if they were undecided between two vessel speeds. In instances where a decision between two speeds was difficult, observers selected the slower speed. This may provide a potential underestimate or more conservative assessment.

Boater compliance was evaluated for the no wake zone in the east section of the east pool and classified as either compliant (a vessel which is maintaining a speed that did not produce a wake) or non-compliant (a vessel that was determined to be producing a wake in an area posted as “no wake”). This assessment was made by the observer in the field.

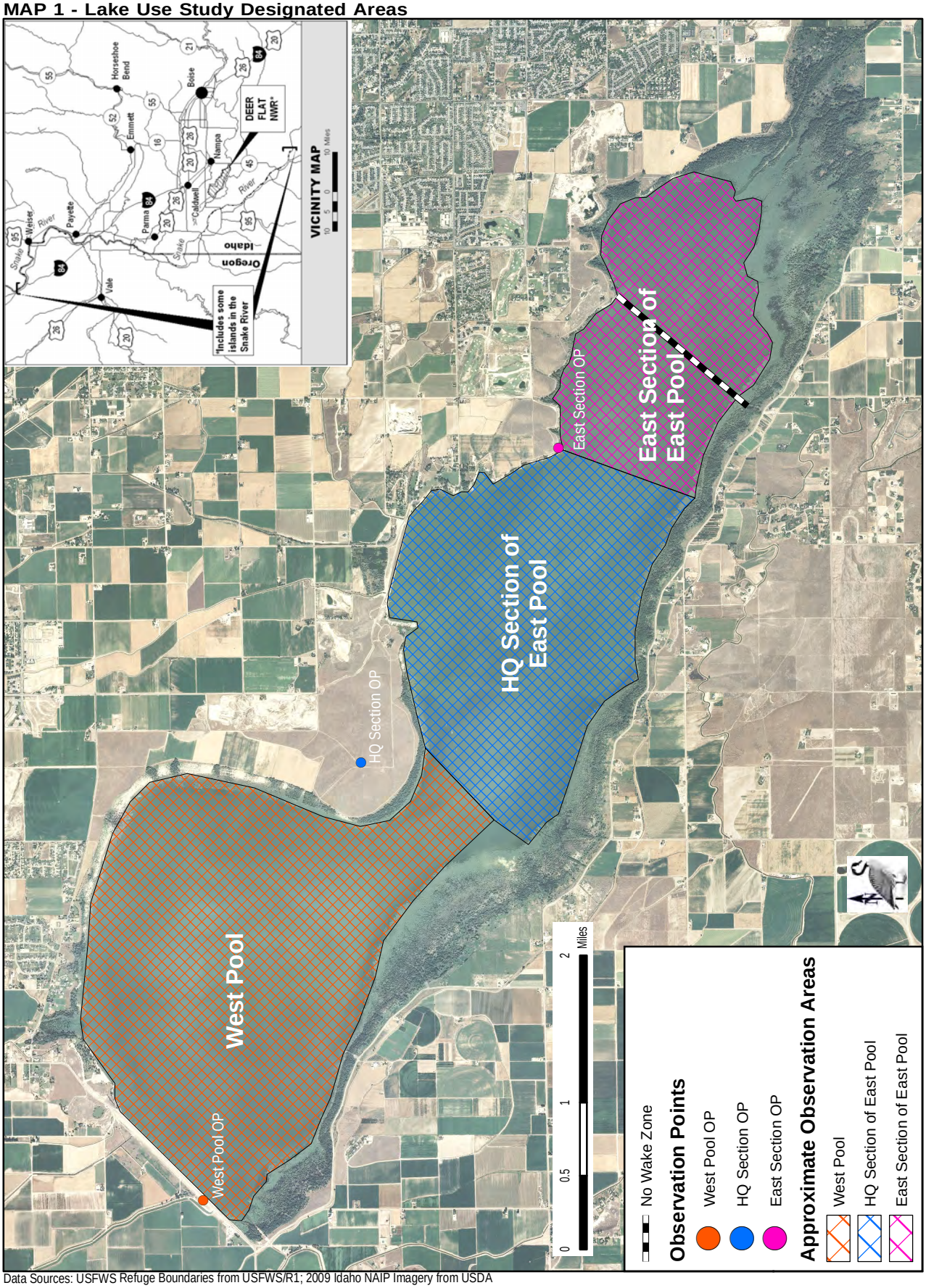
Efforts were made throughout the survey to ensure the quality and consistency of the data collected. Training sessions were conducted at each site prior to study commencement. The training session allowed the observers to gain familiarity with the field data collection sheets, data collection methods, and geographic characteristics unique to each survey site. Binoculars and spotting scopes were available to observers.

Boater Observation Sampling Locations, Time Blocks, & Sampling Schedule

Use levels on the Lake were organized into three categories: 1) Low use, 2) High use, and 3) Peak use days. *Peak use days* are times that are known to be the highest levels of use on the lake (e.g. Memorial Day, Labor Day). *High use days* are non-holiday days when use levels are known to be high (e.g. weekends in August, opening day). Finally, *low use days* are week days and other less popular times. For the purposes of this study, these use estimates were made based on the expert judgment of Refuge management.

Lake Lowell was organized into the following three use zones for the purpose of this study. The west pool was observed from the *Lower Dam* observation point. Two vantage points were necessary in the east pool due to the topography of the area; the east section of the east pool was observed from the *Viewing Platform* east of the Visitor Center (Headquarters section of the East Pool or Headquarters section) and the *Gotts Point* observation point (East section of the East Pool or East section). Refer to Map 1.

MAP 1 - Lake Use Study Designated Areas



Data Sources: USFWS Refuge Boundaries from USFWS/R1; 2009 Idaho NAIP Imagery from USDA
File: 12-005-9 Map Date: 05/03/2012

The plan included allowing observers to be in the field collecting data between 7am and 9pm. Five time blocks were used for the study. The blocks were three hours long; except for block 5 that was a two hour block. The time blocks used were: 7am to 10am; 10am to 1pm; 1pm to 4pm; 4pm to 7pm; and 7pm to 9pm. These time blocks accounted for the variation in recreation activity styles (e.g., morning fishing, afternoon water skiing, after dinner cruising). Actual observation times in the field were dependent on the random schedule generated and the availability of observers from the Refuge. The full sampling schedule can be found in Appendix 2. The schedule was stratified into the three zones on the Lake as described in the sampling location section. A combination of purposive and random methods were used to design the schedule. Peak use days were purposively sampled. Peak days represent potential boater conflicts and other stresses on the system that are important for management to identify and understand. Low and high use days were randomly selected.

The following definitions apply to the sampling schedule. A *Sampling Day* is a single date that sampling took place (e.g. April 15 or July 4). A S*ampling Block* is the three hour block that the field technician spends in the field. A *Sampling Episode* is when data is being collected from one of the vantage points (e.g. on April 15 observations will be made at the Gotts Point vantage point). An *Observation period* is when the field technician records boat data on the lake. One observation period occurs every 20 minutes, allowing for a maximum of 10 observation periods during each three hour sampling block.

There are a total of 169 potential sampling days between April 15, 2011 and September 30, 2011: 9 holiday days (3 holiday weekends), 42 regular weekend days, and 118 regular weekdays. The original sampling plan included the following. Each of the 3 lake zones would be sampled twice on peak use holiday weekends. This would result in a total of 6 sampling days during peak use times. Each zone would be sampled 3 times in each time block during high use days, resulting in 15 sampling days during

high use days. Finally, each zone would be sampled 4 days in each time block during low use times, resulting in 20 sampling days on low use days.

Minor modifications were necessary due to issues such as weather, availability of field personnel, and other unforeseen issues. Prior to each field day the data collection team consulted local weather forecasts to avoid poor weather that may influence boat traffic patterns or compromise personal safety. When possible, the next available sampling day of the same use type in the same use zone was selected to replace the missed sampling episode.

The final sampling schedule resulted in the following number of observations at each location: 903 observations at the west pool; 740 observations at the Headquarters section of the East Pool; and 453 observations at the East section of the East Pool. The data collection methods produced a diversity of types of use days (low, medium, and high), times of day, and locations on the Lake. However, the results may not apply to locations, days, and times of the day that were not included in the analyses.

Parking Lot and Vehicle Count Method

An NC-200 Portable Traffic Analyzer which utilizes Vehicle Magnetic Imaging was used to count vehicles entering the parking areas. These devices count vehicles in only one direction of travel. Traffic counters and support for using the counters was provided by U.S. Department of Transportation, Central Federal Lands Highway Division (CFLHD) located in Lakewood Colorado.

A sampling schedule was designed to collect traffic data from each of the use level days at five different parking areas. The parking areas were: 1) Upper Dam West Entrance, 2) Upper Dam East Entrance, 3) Parking Lot 1, 4) Lower Dam Recreation Area Entrance, and 5) Parking Lot 7. Traffic data collection consisted of setting up the counter and collecting data for 14 continuous days. This occurred twice for each parking area. The 14 day sampling periods included all three use level designations (low use days, high use days, and peak use days). The two week periods were: May 19 to June 1 and

September 1 to September 14. A technical issue meant that data were collected at Parking Lot 7 only in September.

A single set-up configuration was designed for each of the parking areas and used during both sampling episodes. A research technician was stationed at the parking area to do a one-time calibration of the traffic count method. For a two-hour period the observer counted the number of vehicles entering the area and the number of boats. Observer vehicle counts were compared to traffic counter data to confirm the accuracy of the counters.

A ratio of vehicles with trailers and without was established to estimate the total number of vessels entering the system on the sample days. The ratio was created using data from regular parking lot vehicle counts performed by Refuge staff and volunteers. One parking lot count consisted of a Refuge volunteer spending one hour in each parking lot and counting the number of vehicles, trailers, number of people per vehicle, and their apparent activity. Data were used from a total of 87 parking lot counts across all lots with traffic counters. Counts were conducted throughout the 2011 season (May to September), distributed across times of the day (morning, afternoon, evening), and conducted on weekdays and weekends. Specific day and time blocks for parking lot counts were determined by a pre-existing random sampling schedule established by the refuge.

Ratio weights were established by dividing the average number of trailers by the average number of vehicles observed during the observations for that lot. For example, if 100 vehicles entered a parking area and 50 of them were pulling trailers, the ratio weight used for that lot would be 0.50. A weight of 0.50 indicates that half of the vehicles were pulling trailers. Outliers in the data were adjusted because there is the possibility of peak use levels during holiday events. Any values beyond three standard deviations from the average were brought into the third standard deviation based on data for each individual lot. Only two outliers were identified and adjusted.

Results

Number of Vessels Observed

This section reports the number of vessels-at-one-time (VAOT) observed in the East section of the East Pool, Headquarters section of the East Pool, and West Pool for the particular time block. The range provides a sense of the variation in Lake use. The observations were made at 20 minute intervals. The data are stratified by the use level categories: weekday low use, weekend high use, and holiday peak use. The results are shown in Tables 2, 3, and 4.

East section of the East Pool

Use in the East section of the East Pool during low use and high use days was not very different; with the exception of one day when the peak number of vessels on a weekend day was 11. The highest number of vessels observed on the East section of the East Pool was 23 during the 4th of July weekend.

Table 2. East section of the East Pool: Low and Peak number of vessels during observation period

Date	Use Level Designation	Time interval	Low # vessels observed	Peak # vessels observed	Range
5/13/11	Weekday low use	1:00 pm to 3:40 pm	2	7	5
8/15/11	Weekday low use	4:00 pm to 6:40 pm	1	1	
9/16/11	Weekday low use	10:00 am to 12:40 pm	1	2	1
4/30/11	Weekend high use	1:00 pm to 3:40 pm	1	3	2
6/4/11	Weekend high use	10:00 am to 12:40 pm	6	11	5
7/16/11	Weekend high use	7:00 pm to 8:40 pm	3	8	5
8/14/11	Weekend high use	10:00 am to 12:40 pm	2	8	6
7/2/11	Holiday peak use	4:00 pm to 6:40 pm	11	23	12
9/5/11	Holiday peak use	10:00 am to 12:20 pm	1	8	7

Headquarters section of the East Pool

Peak use in the Headquarters section of the East Pool on low use days ranged from 1 to 11 vessels. Peak use on weekend high use days ranged from 4 to 51 vessels. However, the report of 51 is not consistent with other counts from this area. The observer indicated that the number was accurate and that July 10th 2011 was an unusually high use day. Holiday peak use days were similar to other weekend high use days; peak use ranged from 6 to 14. Use levels in the Headquarters section of the East Pool were consistent across the three use strata.

Table 3. Headquarters section of the East Pool: Low and Peak number of vessels during observation period

Date	Use Level Designation	Time interval	Low # vessels observed	Peak # vessels observed	Range
5/5/11	Weekday low use	10:00 am to 12:40 pm	1	11	10
5/23/11	Weekday low use	1:00 pm to 4:00 pm	1	2	1
6/24/11	Weekday low use	10:00 am to 12:40 pm	3	10	7
7/19/11	Weekday low use	7:40 pm to 8:20 pm	3	4	1
8/10/11	Weekday low use	1:00 pm to 3:40 pm	2	10	8
9/1/11	Weekday low use	12:00 pm to 12:20 pm	1	1	
9/26/11	Weekday low use	4:00 pm to 6:00 pm	1	3	2
4/24/11	Weekend high use	10 am to 12:40 pm	1	4	3
6/18/11	Weekend high use	1:00 pm to 1:20 pm	3	4	1
7/10/11	Weekend high use	4:30 pm to 7:00 pm	30	51	21
8/6/11	Weekend high use	10:00 am to 12:40 pm	5	11	6
8/28/11	Weekend high use	4:00 pm to 7:00 pm	1	13	12
5/30/11	Holiday peak use	1:00 pm to 4:00 pm	1	6	5
9/3/11	Holiday peak use	10 am to 12:40 pm	3	14	11

West Pool

Peak use in the West Pool on low use days ranged from 1 to 21 vessels. The peak of 21 vessels on August 5th 2011 was again not consistent with other low use day observations. The next highest report was 9. Weekend high use peak use ranged from 1 to 23 vessels. Finally, peak use on holiday peak use days ranged from 3 to 19 vessels. In general, the low use days are lower than both the weekend and holiday days. The weekend and holiday days were similar. The highest number of vessels observed in the West Pool was 23 at one time.

Table 4. West Pool: Low and Peak number of vessels during observation period

Date	Use Level Designation	Time interval	Low # vessels observed	Peak # vessels observed	Range
5/3/11	Weekday low use	9:00 pm to 9:40 pm	1	2	1
5/18/11	Weekday low use	11:00 am to 12:40 pm	2	1	1
6/29/11	Weekday low use	1:00 pm to 3:20 pm	2	2	
7/11/11	Weekday low use	10:00 am to 12:40 pm	3	5	2
8/5/11	Weekday low use	7:00 pm to 9:00 pm	10	21	11
8/23/11	Weekday low use	7:00 pm to 9:00 pm	1	9	8
9/21/11	Weekday low use	1:00 pm to 3:40 pm	4	8	4
4/16/11	Weekend high use	3:00 pm to 6:00 pm	3	19	16
5/7/11	Weekend high use	4:00 pm to 7:00 pm	1	1	
6/12/11	Weekend high use	10:00 am to 12:40 pm	1	21	20
7/24/11	Weekend high use	7:00 pm to 9:00 pm	4	21	17
8/20/11	Weekend high use	1:00 pm to 3:40 pm	6	23	17
5/29/11	Holiday peak use	10:00 am to 12:40 pm	1	3	2
7/3/11	Holiday peak use	7:00 pm to 8:40 pm	11	19	8

Boater Characteristic Description

Results of the boater characteristics data are reported in both raw numbers and percentages of boats observed. Percentages allow for comparison across the three pools. The observers collected data in 20 minute intervals; one observation every 20 minutes.

Vessel Type

Results of the vessel type data are shown in Table 5. The majority of vessels on Lake Lowell are motorboats. The Headquarters section of the East Pool has the most pontoon boats (3%) compared to the West Pool and East section of the East Pool (2% and <1%, respectively). The distribution of human powered boats was similar. Less than 1% of all boats observed were sailboats in the Headquarters section of the East Pool and none were observed in the West Pool or East section of the East Pool. The largest percentage of personal watercraft were observed in the Headquarters section of the East Pool (7%); closely followed by the West Pool (6%) and finally the East section of the East Pool (4%). No windsurfers were observed.

Table 5. Vessel type summary data for all observations

	West Pool		Headquarters section		East section		Total	
	#	%	#	%	#	%	#	%
Motorboat	799	88%	613	85%	415	92%	1827	88%
Pontoon Boat	19	2%	19	3%	1	<1%	39	2%
Human powered[1]	27	3%	30	4%	16	3%	73	3%
Sailboat			6	<1%			6	<1%
Personal watercraft	57	6%	54	7%	19	4%	130	6
Kite surfer								
Wind surfer								
Other	1	<1%					1	<1%
Total observations	903		722		451		2073	

[1]Kayak\canoe\float

Vessel Size

The vessel size data are shown in Table 6. Almost all of the vessels are 25 feet long or less. The majority are 16 to 25 feet long. The smaller vessels (<16 feet) appear to use the West Pool and Headquarters section of the East Pool more than the East section of the East Pool. Less than 1% of the vessels observed were larger than 25 feet. Most of them were observed in the West and Headquarters section of the East Pools.

Table 6. Vessel size summary data for all observations

	West Pool		Headquarters section		East section		Total	
	#	%	#	%	#	%	#	%
Less than 16 feet	134	14%	99	14%	37	8%	270	13%
16 to 25 feet	759	84%	615	85%	414	92%	1788	86%
26 to 39 feet	7	<1%	8	<1%			15	<1%
Total observations	900		722		451		2073	

Location in the Pool

The location data are shown in Table 7. The totals indicate that the majority of boaters were observed in open water. The East section of the East Pool had the largest variation with 64% on open water, 15% in emergent beds, 18% on the edge of emergent beds, and 3% at the bank. The West Pool had the second most variation and the Headquarters section of the East Pool was the most homogeneous.

Table 7. Location summary data for all observations

	West Pool		Headquarters section		East section		Total	
	#	%	#	%	#	%	#	%
Open Water	652	72%	602	83%	288	64%	1542	74%
Emergent bed	105	12%	24	3%	69	15%	198	9%
Edge of emergent bed	76	8%	40	6%	83	18%	199	9%
Bank	15	2%	7	<1%	11	3%	33	2%
Dock	55	6%	48	7%			103	5%
Total observations	903		721		451		2075	

Recreational boating activity

The recreational activity data are shown in Table 8. Most boats were engaged in some kind of activity when observed; the totals show that only 21% of observed vessels were traveling or milling. The most popular activity was fishing (38% of total observations). Fishing was the most popular activity on both the West Pool and the East section of the East Pool and second most popular on the Headquarters section of the East Pool. Skiing and tubing was the second most popular activity overall. Skiing and tubing was the most popular activity on the Headquarters section of the East Pool and second most popular on the West Pool and East section of the East Pool. Travel was the third most popular activity on all three pools.

Table 8. Activity summary data for all observations

	West Pool		Headquarters section		East section		Total	
	#	%	#	%	#	%	#	%
Travel	179	20%	149	21%	61	13%	389	19%
Milling	17	2%	17	2%	9	2%	43	2%
Skiing & Tubing	198	22%	209	29%	96	21%	503	24%
Fishing	360	40%	195	27%	238	53%	793	38%

Recreation[1]	91	10%	96	13%	45	10%	232	11%
Docked	57	6%	56	8%	2	1%	115	6%
Total observations	902		722		451		2075	

[1]Vessels classified as recreational included wind surfers and kite boarders, or vessels anchored with people swimming nearby or picnicking and not fishing and/or observing wildlife.

Activity summary for locations in pools

Tables 9, 10, and 11 show that the majority of people in all three Pools were located in open water (East section 72%; HQ section 83%, West Pool 64%). The most popular activities in open water were consistent in the three pools: skiing & tubing, fishing and travel. Almost all of the boats in the emergent beds and on the edge of the emergent beds were being used for the activity of fishing.

Table 9. Location of Activities in West Pool

	Travel		Milling		Skiing & Tubing		Fishing		Recreation		Docked		Total
	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#
Open Water	162	25%	16	2%	196	30%	191	29%	84	13%	2	<1%	652
Emergent Bed	4	4%					100	95%	1	1%			105
Edge of Emergent Bed	6	8%	1	1%	2	3%	67	88%					76
Bank	5	33%					1	7%	6	40%	3	20%	15
Dock	2[2]	4%					1	2%			52	95%	55

1Percentage of vessels being used for this activity of the total number of vessels observed in this location
2 Two vessels were observed pulling away or approaching the dock and were classified as traveling while in proximity to the dock.

Table 10. Location of Activities in Headquarters section of the East Pool

	Travel		Milling		Skiing & Tubing		Fishing		Recreation		Docked		Total
	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#
Open Water	145	24%	17	3%	209	35%	136	23%	91	15%	4	1%	602
Emergent Bed	4	17%					20	83%					24
Edge of Emergent Bed							39	97%	1	3%			40
Bank									4	57%	3	43%	7
Dock											48	100%	48

1Percentage of vessels being used for this activity of the total number of vessels observed in this location

Table 11. Location of Activities in East section of the East Pool

	Travel		Milling		Skiing & Tubing		Fishing		Recreation		Docked		Total
	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#	%[1]	#
Open Water	60	21%	9	3%	95	33%	80	28%	44	15%			288
Emergent Bed	1	1%					67	97%	1	1%			69
Edge of Emergent Bed							83	100%					83
Bank					1	9%	8	73%			2	18%	11
Dock													

1Percentage of vessels being used for this activity of the total number of vessels observed in this location

Compliance with no wake zone

The compliance data for the no wake zone in the East section of the East Pool are shown in Table 12. Vessels were classified as either Compliant – A vessel which is maintaining a speed that did not produce a wake, or Non-compliant – A vessel that was determined to be producing a wake in an area posted as "no wake." Vessel speed was qualitatively determined and is therefore subject to individual observer interpretation. Physical and environmental factors, including wind speed/direction, may affect vessel speed as well as the degree of water displacement from the bow and/or stern. Observers were instructed to consider these factors and request the opinion of their fellow observer (when possible) if they were undecided between two vessel speeds. In instances where a decision between two speeds was difficult, observers selected the slower speed. This may provide a potential underestimate or more conservative assessment. A total of 346 vessels were observed in the East section of the East Pool no wake zone. Of the vessels in the no wake zone, 88% were compliant and 12% were not.

Table 12. Compliance summary for vessels in East section of the East Pool no wake zone

	#	%
Compliant	303	88%
Non-compliant	43	12%
Total observations	346	

Vessel Speed

The largest percentage of the observed vessels were idling (see Table 13). This is consistent with the recreational activity summary indicating that most vessels were fishing. The second largest category was planing. This is also consistent with skiing and tubing being second most popular activities and travel as the third most popular.

Table 13. Vessel speed summary data for all observations

	West Pool		Headquarters		East section of the East Pool		Total	
	#	%	#	%	#	%	#	%
Idle	439	49%	271	38%	268	59%	978	47%
Slow	118	13%	76	10%	16	4%	210	10%
Plowing	19	2%	11	1%	11	3%	41	2%
Cruising	31	3%	44	6%	22	5%	97	5%
Planing	296	33%	319	44%	128	28%	743	36%
Under sail			1	<1%			1	<1%
Paddling					6	<1%	6	<1%
Total observations	903		722		451		2076	

Summary of boater characteristics

The following description is based on the summary data in tables 5 through 13. The typical vessel on Lake Lowell is a motorboat between 16 to 25 feet in length and can be found in open water.

The most common activities people in the vessels participate in are fishing or skiing and tubing. Most of the vessels are not moving (fishing or standing) and many are moving at a planing speed while skiing and tubing. Of the vessels that do enter the no wake zone in the east section of the east pool, most comply with the no wake regulation.

Parking Lot Traffic Counter Data

The traffic counter data are displayed in Tables 14 through 29. One table is provided for each 14-day sampling episode and one summary table for each parking lot sampled. Vehicle trailer ratios were created as described in the methods section and used to estimate the number of trailers entering the system based on the traffic counts. This provides an estimate of the vessels being launched on Lake Lowell on a given day. The vehicle to trailer ratio weights, that indicate what portion of the vehicles in the parking lot are apparently pulling trailers, are shown in Table 14 for each parking lot. Parking Lot 1, the Lower Dam Entrance, and the Upper Dam East entrance had the largest trailer traffic of the five lots. Parking Lot 7 had the lowest vehicle to trailer ratio.

Table 14. Vehicle to trailer weighting ratios[1] from parking lot counts from 4/15-9/30/11

Parking Lot	Ratio/weight
Upper Dam West Entrance	0.52
Upper Dam East Entrance	0.70
Parking Lot 1	0.78
Lower Dam Recreation Area Entrance	0.73
Parking Lot 7	0.14

1Weighting ratios indicate the proportion of vehicles in the parking lot pulling trailers.

The summary descriptive statistics for the traffic counter data collected during all of the days in each of the parking lots is shown in Tables 15 and 16. The range and standard deviation are indicators of the variability in use at each parking lot. Given the difference in parking lot size it is not appropriate to

directly compare the variability between the lots. Within each lot a low range and standard deviation indicate that the amount of use at the parking lot is relatively consistent. A high range and standard deviation would suggest that use levels are variable.

Table 15. Summary descriptive statistics for vehicle traffic counts from magnetic counter

Parking Lot	Range	Minimum	Maximum	Average	Standard Deviation
Upper Dam West Entrance	105	32	137	70	28.9
Upper Dam East Entrance	180	62	242	110	38.2
Parking Lot 1	50	4	54	22	12.0
Lower Dam Recreation Area Entrance	601	99	700	240	147.9
Parking Lot 7	29	14	43	27	9.3

Table 16. Minimum, maximum and average number of trailers estimated using trailer weight ratios

Parking Lot	Minimum	Maximum	Average
Upper Dam West Entrance	17	71	36
Upper Dam East Entrance	43	169	77
Parking Lot 1	3	42	17
Lower Dam Recreation Area Entrance	72	511	175
Parking Lot 7	2	6	4

Parking lot traffic count results: Upper Dam West Entrance

The traffic counter data for the Upper Dam West Entrance are displayed in Tables 17, 18, and 19. The number of vehicles entering the Upper Dam West parking lot on low use weekdays ranged from 32 to 68 with 17 to 35 trailers respectively; and the average number of vehicles on low use days was 53 with 28 trailers. There was not much difference between the weekend high use and peak use day results. The number of vehicles on weekend high use days ranged from 69 to 124 (36 to 64 trailers). The

number of vehicles on peak use days ranged from 62 to 137 (32 to 71 trailers). The average for high use days was 99 and peak use days was 100 (52 and 51 trailers, respectively).

Table 17. Parking lot traffic count results: Upper Dam West Entrance, 5/19/11 to 6/1/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
5/19/11	Thursday	Weekday low use	40	21
5/20/11	Friday	Weekday low use	70	36
5/23/11	Monday	Weekday low use	33	17
5/24/11	Tuesday	Weekday low use	57	30
5/25/11	Wednesday	Weekday low use	38	20
5/26/11	Thursday	Weekday low use	39	20
5/27/11	Friday	Weekday low use	32	17
5/31/11	Tuesday	Weekday low use	78	41
6/1/11	Wednesday	Weekday low use	54	28
5/21/11	Saturday	Weekend high use	114	59
5/22/11	Sunday	Weekend high use	69	36
5/28/11	Saturday	Holiday peak use	62	32
5/29/11	Sunday	Holiday peak use	72	37
5/30/11	Monday	Holiday peak use	109	57

[1]The vehicle to trailer weighting ratio is 0.52

Table 18. Parking lot traffic count results: Upper Dam West Entrance, 9/1/11 to 9/14/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
9/1/11	Thursday	Weekday low use	68	35
9/2/11	Friday	Weekday low use	47	24
9/6/11	Tuesday	Weekday low use	74	38
9/7/11	Wednesday	Weekday low use	59	31
9/8/11	Thursday	Weekday low use	64	33
9/9/11	Friday	Weekday low use	55	29
9/12/11	Monday	Weekday low use	51	27

9/13/11	Tuesday	Weekday low use	57	30
9/14/11	Wednesday	Weekday low use	51	27
9/10/11	Saturday	Weekend high use	90	47
9/11/11	Sunday	Weekend high use	124	64
9/3/11	Saturday	Holiday peak use	110	57
9/4/11	Sunday	Holiday peak use	112	58
9/5/11	Monday	Holiday peak use	137	71

[1]The vehicle to trailer weighting ratio is 0.52

Table 19. Average number of vehicles per day Upper Dam West Entrance

Use Level Designation	Average number of vehicles	Trailer Estimate[1]
Holiday peak use	100	52
Weekend high use	99	51
Weekday low use	53	28

[1]The vehicle to trailer weighting ratio is 0.52

Parking lot traffic count results: Upper Dam East Entrance

The traffic counter data for the Upper Dam East Entrance are displayed in Tables 20, 21, and 22. The number of vehicles entering the Upper Dam East parking lot on low use weekdays ranged from 62 to 123 with 43 to 86 trailers respectively; and the average on low use days was 90 vehicles with 63 trailers. There was overlap of the high use day and peak use day ranges. However, there appears to be the potential for extreme peak use levels at this parking area. The number of vehicles on weekend high use days ranged from 131 to 156 (92 to 109 trailers). The number of vehicles on peak use days ranged from 79 to 242 (55 to 169 trailers). The average for high use days was 142 and peak use days was 145 (99 and 102 trailers, respectively). The highest vehicle use count observed in this lot during the data collection was 242 on September 5, 2011.

Table 20. Parking lot traffic count results: Upper Dam East Entrance, 5/19/11 to 6/1/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
5/19/11	Thursday	Weekday low use	85	60
5/20/11	Friday	Weekday low use	123	86
5/23/11	Monday	Weekday low use	65	46
5/24/11	Tuesday	Weekday low use	110	77
5/25/11	Wednesday	Weekday low use	88	62
5/26/11	Thursday	Weekday low use	63	44
5/27/11	Friday	Weekday low use	65	46
5/31/11	Tuesday	Weekday low use	97	68
6/1/11	Wednesday	Weekday low use	62	43
5/21/11	Saturday	Weekend high use	156	109
5/22/11	Sunday	Weekend high use	134	94
5/28/11	Saturday	Holiday peak use	79	55
5/29/11	Sunday	Holiday peak use	111	78
5/30/11	Monday	Holiday peak use	152	106

[1]The vehicle to trailer weighting ratio is 0.70

Table 21. Parking lot traffic count results: Upper Dam East Entrance, 9/1/11 to 9/14/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
9/1/11	Thursday	Weekday low use	80	56
9/2/11	Friday	Weekday low use	107	75
9/6/11	Tuesday	Weekday low use	88	62
9/7/11	Wednesday	Weekday low use	92	64
9/8/11	Thursday	Weekday low use	102	71
9/9/11	Friday	Weekday low use	106	74
9/12/11	Monday	Weekday low use	102	71
9/13/11	Tuesday	Weekday low use	90	63
9/14/11	Wednesday	Weekday low use	106	74
9/10/11	Saturday	Weekend high use	148	104

9/11/11	Sunday	Weekend high use	131	92
9/3/11	Saturday	Holiday peak use	149	104
9/4/11	Sunday	Holiday peak use	140	98
9/5/11	Monday	Holiday peak use	242	169

[1]The vehicle to trailer weighting ratio is 0.70

Table 22. Average number of vehicles per day Upper Dam East Entrance

Use Level Designation	Average number of vehicles	Trailer Estimate[1]
Holiday peak use	145	102
Weekend high use	142	99
Weekday low use	90	63

[1]The vehicle to trailer weighting ratio is 0.70

Parking lot traffic count results: Parking Lot 1

The traffic counter data for Parking Lot 1 are displayed in Tables 23, 24, and 25. The number of vehicles entering Parking Lot 1 on low use weekdays ranged from 4 to 34 with 3 to 27 trailers respectively; and the average on low use days was 19 vehicles with 15 trailers. There was not much difference between the high use day and peak use day ranges. The number of vehicles on weekend high use days ranged from 13 to 54 (10 to 42 trailers). The number of vehicles on peak use days ranged from 12 to 47 (9 to 37 trailers). The average for high use days (31 vehicles) was higher than the average for peak use days (24 vehicles) (24 and 19 trailers, respectively). The highest vehicle count for Parking Lot 1 was observed during a regular high use weekend and not during a holiday peak use weekend (54 vehicles on May 22, 2011).

Table 23. Parking lot traffic count results: Parking Lot 1, 5/19/11 to 6/1/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
5/19/11	Thursday	Weekday low use	34	27
5/20/11	Friday	Weekday low use	30	23
5/23/11	Monday	Weekday low use	25	20
5/24/11	Tuesday	Weekday low use	20	16
5/25/11	Wednesday	Weekday low use	21	16
5/26/11	Thursday	Weekday low use	24	19
5/27/11	Friday	Weekday low use	29	23
5/31/11	Tuesday	Weekday low use	33	26
6/1/11	Wednesday	Weekday low use	22	17
5/21/11	Saturday	Weekend high use	43	34
5/22/11	Sunday	Weekend high use	54	42
5/28/11	Saturday	Holiday peak use	28	22
5/29/11	Sunday	Holiday peak use	16	12
5/30/11	Monday	Holiday peak use	47	37

[1]The vehicle to trailer weighting ratio is 0.78

Table 24. Parking lot traffic count results: Parking Lot 1, 9/1/11 to 9/14/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
9/1/11	Thursday	Weekday low use	4	3
9/2/11	Friday	Weekday low use	18	14
9/6/11	Tuesday	Weekday low use	13	10
9/7/11	Wednesday	Weekday low use	6	5
9/8/11	Thursday	Weekday low use	18	14
9/9/11	Friday	Weekday low use	16	12
9/12/11	Monday	Weekday low use	15	12
9/13/11	Tuesday	Weekday low use	8	6
9/14/11	Wednesday	Weekday low use	12	9
9/10/11	Saturday	Weekend high use	13	10
9/11/11	Sunday	Weekend high use	13	10

9/3/11	Saturday	Holiday peak use	16	12
9/4/11	Sunday	Holiday peak use	12	9
9/5/11	Monday	Holiday peak use	23	18

[1]The vehicle to trailer weighting ratio is 0.78

Table 25. Average number of vehicles per day Parking Lot 1

Use Level Designation	Average number of vehicles	Trailer Estimate[1]
Holiday peak use	24	19
Weekend high use	31	24
Weekday low use	19	15

[1]The vehicle to trailer weighting ratio is 0.78

Parking lot traffic count results: Lower Dam Recreation Area Entrance

The traffic counter data for the Lower Dam Recreation Area Entrance are displayed in Tables 26, 27, and 28. The number of vehicles entering the Lower Dam Recreation Area parking lot on low use weekdays ranged from 99 to 353 with 72 to 258 trailers respectively; and the average on low use days was 157 vehicles with 115 trailers. There was overlap between the high use day and peak use day ranges. There was also an extreme peak use value observed at this lot. The number of vehicles on weekend high use days ranged from 312 to 486 (228 to 355 trailers). The number of vehicles on peak use days ranged from 197 to 700 (144 to 511 trailers). The average for high use days was 387 and peak use days was 390 (283 and 285 trailers, respectively). The highest vehicle count observed during the data collection was 700 on September 5, 2011.

Table 26. Parking lot traffic count results: Lower Dam Recreation Area Entrance, 5/19/11 to 6/1/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
5/19/11	Thursday	Weekday low use	162	118
5/20/11	Friday	Weekday low use	353	258
5/23/11	Monday	Weekday low use	129	94
5/24/11	Tuesday	Weekday low use	174	127
5/25/11	Wednesday	Weekday low use	117	85
5/26/11	Thursday	Weekday low use	137	100
5/27/11	Friday	Weekday low use	112	82
5/31/11	Tuesday	Weekday low use	176	128
6/1/11	Wednesday	Weekday low use	200	146
5/21/11	Saturday	Weekend high use	405	296
5/22/11	Sunday	Weekend high use	486	355
5/28/11	Saturday	Holiday peak use	197	144
5/29/11	Sunday	Holiday peak use	216	158
5/30/11	Monday	Holiday peak use	357	261

[1]The vehicle to trailer weighting ratio is 0.73

Table 27. Parking lot traffic count results: Lower Dam Recreation Area Entrance, 9/1/11 to 9/14/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
9/1/11	Thursday	Weekday low use	138	101
9/2/11	Friday	Weekday low use	192	140
9/6/11	Tuesday	Weekday low use	161	118
9/7/11	Wednesday	Weekday low use	143	104
9/8/11	Thursday	Weekday low use	170	124
9/9/11	Friday	Weekday low use	115	84
9/12/11	Monday	Weekday low use	144	105
9/13/11	Tuesday	Weekday low use	111	81
9/14/11	Wednesday	Weekday low use	99	72
9/10/11	Saturday	Weekend high use	344	251
9/11/11	Sunday	Weekend high use	312	228

9/3/11	Saturday	Holiday peak use	380	277
9/4/11	Sunday	Holiday peak use	489	357
9/5/11	Monday	Holiday peak use	700	511

[1]The vehicle to trailer weighting ratio is 0.73

Table 28. Average number of vehicles per day Lower Dam Recreation Area Entrance

Use Level Designation	Average number of vehicles	Trailer Estimate[1]
Holiday peak use	390	285
Weekend high use	387	283
Weekday low use	157	115

[1]The vehicle to trailer weighting ratio is 0.73

Parking lot traffic count results: Parking Lot 7

The traffic counter data for Parking Lot 7 are displayed in Tables 29 and 30. Data were only collected for one two-week period in this lot. The number of vehicles entering Parking Lot 7 on low use weekdays ranged from 14 to 36 with 2 to 5 trailers respectively; and the average on low use days was 23 vehicles with 3 trailers. There was not much difference between the high use day and peak use day ranges. The number of vehicles on weekend high use days ranged from 23 to 42 (3 to 6 trailers). The number of vehicles on peak use days ranged from 26 to 43 (4 to 6 trailers). The average for high use days was 32 and peak use days was 35 (4 and 5 trailers, respectively).

Table 29. Parking lot traffic count results: Parking Lot 7, 9/1/11 to 9/14/11

Date	Day of week	Use Level Designation	Number of vehicles	Trailer Estimate[1]
9/1/11	Thursday	Weekday low use	19	3
9/2/11	Friday	Weekday low use	31	4
9/6/11	Tuesday	Weekday low use	18	3
9/7/11	Wednesday	Weekday low use	22	3
9/8/11	Thursday	Weekday low use	29	4

9/9/11	Friday	Weekday low use	36	5
9/12/11	Monday	Weekday low use	21	3
9/13/11	Tuesday	Weekday low use	19	3
9/14/11	Wednesday	Weekday low use	14	2
9/10/11	Saturday	Weekend high use	42	6
9/11/11	Sunday	Weekend high use	23	3
9/3/11	Saturday	Holiday peak use	26	4
9/4/11	Sunday	Holiday peak use	43	6
9/5/11	Monday	Holiday peak use	37	5

[1]The vehicle to trailer weighting ratio is 0.14

Table 30. Average number of vehicles Parking Lot 7

Use Level Designation	Average number of vehicles	Trailer Estimate[1]
Holiday peak use	35	5
Weekend high use	32	4
Weekday low use	23	3

[1]The vehicle to trailer weighting ratio is 0.14

Parking lot traffic count summary

The Lower Dam Recreation Area was the highest use lot and exhibited the largest variation in use levels with the highest individual count of vehicles (700 vehicles on September 5, 2011). Parking Lots 1 and 7 were similar in terms of use with averages of 22 and 27 respectively. However, Parking Lot 1 displayed greater variation in use with a range of 50 vehicles compared to 29 vehicles in Lot 7. Sampling occurred on both Memorial Day (5/28 to 5/30 2011) and Labor Day (9/3 to 9/5 2011) weekends. Parking lot counts were consistently higher on Labor Day weekend compared to Memorial Day weekend.

References Cited

Gorzelany, J.F., 2005 Recreational boater traffic surveys of Broward County, Florida: technical report submitted to Florida Fish and Wildlife Conservation Commission, 89 pp.

Appendix 1: Lake Use Observation Data Sheet

Lake Lowell Recreational Lake Use Study

Page #: of:

ZONE:	WEATHER:
DATE:	WIND SPEED / DIRECTION:
TIME WINDOW:	AVERAGE TEMPERATURE:
OBSERVER(S):	LAKE SURFACE CONDITION:

CODES

TYPE: motorboat (1), pontoon boat (2), human powered -kayak/canoe/float (3), sailboat (4), personal watercraft (5), kite boarder (6), wind surfer (7), other (8)

SIZE: less than 16 ft (1), 16 - 25 (2), 26 - 39 (3), 40 - 64 (4), 65 - 109 (5)

SPEED: Idle (0), Slow (1), Plowing (2), Cruising (3), Planing (4), Under sail (5) Paddling (6)

LOCATION: Open water (1), Emergent bed (2), edge of emergent bed (3), bank (4), Dock (5)

ACTIVITY: Travel (1), Milling (2), Skiing & tubing (3), Fishing (4), Recreation (5), Docked (6),

COMPLIANCE: Compliant (0), Non-compliance (1), Not Applicable (NA)

RECORD #	TIME	TYPE	SIZE	ACTIVITY	LOCATION	SPEED	COMPLIANCE	COMMENTS

Appendix 2: Boater Observation Sampling Schedule

date	use level	survey location	time block
Sunday, April 24, 2011	high	2=HQ Platform	2=10am to 1pm
Tuesday, April 26, 2011	low	1=lower dam	1=7am to 10am
Saturday, April 30, 2011	high	3=Gotts Point	3=1pm to 4pm
Thursday, May 05, 2011	low	2=HQ Platform	2=10am to 1pm
Saturday, May 07, 2011	high	1=lower dam	4=4pm to 7pm
Friday, May 13, 2011	low	3=Gotts Point	3=1pm to 4pm
Sunday, May 15, 2011	high	2=HQ Platform	1=10am to 1pm
Wednesday, May 18, 2011	low	1=lower dam	1=10am to 1pm
Monday, May 23, 2011	low	2=HQ Platform	4=4pm to 7pm
Sunday, May 29, 2011	peak	1=lower dam	2=10am to 1pm
Monday, May 30, 2011	peak	2=HQ Platform	3=1pm to 4pm
Saturday, June 04, 2011	high	3=Gotts Point	1=10am to 1pm
Tuesday, June 07, 2011	low	3=Gotts Point	5=7pm to 9pm
Sunday, June 12, 2011	high	1=lower dam	2=10am to 1pm
Thursday, June 16, 2011	low	1=lower dam	4=4pm to 7pm
Saturday, June 18, 2011	high	2=HQ Platform	3=1pm to 4pm
Friday, June 24, 2011	low	2=HQ Platform	2=10am to 1pm
Wednesday, June 29, 2011	low	3=Gotts Point	3=1pm to 4pm
Saturday, July 02, 2011	peak	3=Gotts Point	4=4pm to 7pm
Sunday, July 03, 2011	peak	1=lower dam	5=7pm to 9pm
Sunday, July 10, 2011	high	2=HQ Platform	4=4pm to 7pm
Monday, July 11, 2011	low	1=lower dam	2=10am to 1pm
Saturday, July 16, 2011	high	3=Gotts Point	5=7pm to 9pm
Tuesday, July 19, 2011	low	2=HQ Platform	5=7pm to 9pm
Sunday, July 24, 2011	high	1=lower dam	5=7pm to 9pm
Thursday, July 28, 2011	low	3=Gotts Point	1=10am to 1pm
Friday, August 05, 2011	low	1=lower dam	5=7pm to 9pm
Saturday, August 06, 2011	high	2=HQ Platform	1=10am to 1pm
Wednesday, August 10, 2011	low	2=HQ Platform	3=1pm to 4pm
Sunday, August 14, 2011	high	3=Gotts Point	2=10am to 1pm
Monday, August 15, 2011	low	3=Gotts Point	4=4pm to 7pm
Saturday, August 20, 2011	high	1=lower dam	3=1pm to 4pm
Tuesday, August 23, 2011	low	1=lower dam	5=7pm to 9pm
Sunday, August 28, 2011	high	2=HQ Platform	4=4pm to 7pm
Thursday, September 01, 2011	low	2=HQ Platform	1=10am to 1pm
Saturday, September 03, 2011	peak	2=HQ Platform	1=10am to 1pm
Monday, September 05, 2011	peak	3=Gotts Point	2=10am to 1pm
Friday, September 16, 2011	low	3=Gotts Point	2=10am to 1pm
Saturday, September 17, 2011	high	3=Gotts Point	5=7pm to 9pm
Wednesday, September 21, 2011	low	1=lower dam	3=1pm to 4pm
Monday, September 26, 2011	low	2=HQ Platform	4=4pm to 7pm

Appendix 3: Parking Lot Count Data Sheet

LAKE LOWELL PARKING LOT COUNTS

Date:_____ Weekend Weekday

Area: Lower Dam Upper Dam West Upper Dam East Parking Lot 1 or 7

Time Block: 7am to 9 am 1pm to 3pm 5pm to 7pm

Observer: _____

Time Start: _____ Time End:_____

Weather:_____

Time	Car	Truck/Van	Vehicle w/ Trailer			Motor-cycle	RV	Approx Length	Activity	Comment
			Motorized Boat	Nonmotorized Boat	Jet ski					

Activity: 1 = Fishing 2 = Water Skiing 3 = Jet skiing 4 = Sailing 5 = Other Recreation

Appendix M. Regional Economic Impacts of Current and Proposed Management Alternatives for Deer Flat National Wildlife Refuge

Document continues on the following page.

DRAFT for REVIEW

Regional Economic Impacts of Current and Proposed Management Alternatives for Deer Flat National Wildlife Refuge

By Lynne Koontz, Catherine M. Cullinane Thomas, and Erik Larsen

Introduction

The National Wildlife Refuge System Improvement Act of 1997 requires all units of the National Wildlife Refuge System to be managed under a Comprehensive Conservation Plan (CCP). The CCP must describe the desired future conditions of a Refuge and provide long range guidance and management direction to achieve refuge purposes. The Deer Flat National Wildlife Refuge (Refuge) is in the process of developing a range of management goals, objectives, and strategies for the CCP. The CCP must contain an analysis of expected effects associated with current and proposed Refuge management strategies.

For CCP planning, a regional economic analysis provides a means of estimating how current management (No Action Alternative) and proposed management activities (Action Alternatives) affect the local economy. This type of analysis provides two critical pieces of information: 1) it illustrates the Refuge's contribution to the local community; and 2) it can help in determining whether economic effects are or are not a real concern in choosing among management alternatives.

It is important to note that the economic value of the Refuge encompasses more than just the impacts on the regional economy. The Refuge also provides substantial nonmarket values (values for items not exchanged in established markets) such as maintaining endangered species, preserving wetlands, educating future generations, and adding stability to the ecosystem (Carver and Caudill, 2007). However, quantifying these types of nonmarket values is beyond the scope of this study.

This report first presents a description of the local communities and economy near the Refuge. Next, the methods used to conduct a regional economic impact analysis are described. An analysis of the final CCP management strategies that could affect stakeholders and residents and the local economy is then presented. The management activities of economic concern in this analysis are:

- Purchases of goods and services within the local community;
- Personnel salary spending;
- Revenues generated from Refuge Revenue Sharing; and
- Spending in the local community by Refuge visitors

Regional Economic Setting

Located southwest of Boise, Idaho, the Refuge has two units, Lake Lowell and the Snake River Islands. The Lake Lowell Unit encompasses more than 10,500 acres, including the almost 9,000-acre Lake Lowell and surrounding lands. The Snake River Islands Unit contains about 1,200 acres on over 100 islands. These islands are distributed along 113 river miles from the Canyon-Ada County Line in Idaho to Farewell Bend in Oregon.

Refuge visitors can enjoy a variety of wildlife-dependent recreational activities, (i.e., wildlife-watching and photography, hunting, fishing, and environmental education and interpretation), as well as non-wildlife dependent recreational activities, including recreational boating, horseback riding, and dog walking. These recreational opportunities attract outside visitors and bring in dollars to the community. Associated visitor activities—such as spending on food, gasoline, and overnight lodging in the area—provides local businesses with supplemental income and increases the local tax base. Management decisions for the Refuge about public use, expansion of services, and habitat improvement may either increase or decrease visitation to the complex and, thus, affect the amount of visitor spending in the local economy.

For the purposes of an economic impact analysis, a region (and its economy) is typically defined as all counties within a 30-60 mile radius of the impact area. Only spending that takes place within this regional area is included as stimulating changes in economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. After consultation with the Refuge staff, it was decided that only the Lake Lowell Unit would be considered for the economic analysis due to the relatively small amount of visitation to the Snake River Islands Unit. The Lake Lowell Unit lies within Canyon County, Idaho. The city of Boise, located in Ada County, is approximately 28 miles from the Refuge. Most of the economic activity related to the Lake Lowell Unit is located within Canyon and Ada counties. Therefore, this two-county area comprises the local economic region for this analysis. The next sections describe the socioeconomic characteristics and trends in the two-county region.

Population and Density

Table 1 summarizes the population characteristics of Idaho and the local two-county area. In 2010, the U.S. Census Bureau estimated the total population for the two counties to be 581,288, or 37% of Idaho's total population. Ada County was the most heavily populated county in both the study area and the state with 392,365 residents in 2010. Canyon County (188,923 residents) was the second most populous county of the state in this same year (United States Census Bureau, 2012; Idaho Department of Labor, 2011a; Idaho Department of Labor, 2011b). In the years leading up to the economic recession of the late 2000s, the two-county area experienced rapid population growth, with the respective populations of Ada and Canyon Counties increasing by 24% and 36% between the years of 2000 and 2008 (United States Census Bureau, 2012). The rapid population growth in the study area throughout the majority of the past decade has been motivated by several factors, including a healthy labor market, relatively low real estate prices, ample opportunity for outdoor recreation, and easy access to the Boise Metro Area (Idaho Department of Labor, 2011b; Cauchon, 2007).

Table 1. Population Estimates for the State and Counties Near the Refuge

Area	Population (2010)†	% Change (2000-2010)†	Persons per Square Mile (2010) †	Expected Population Growth (2010-2030) ‡
Idaho	1,567,582 21	.1%	19	31%
Ada County	392,365	30.4%	373	42%
Canyon County	188,923	43.7%	322	34%

Source: † (United States Census Bureau, 2012) and ‡ (Church, 2003)

In the final two years of the decade, population growth in the study area slowed due to repercussions of the national economic recession, with the populations of Ada and Canyon Counties averaging only 2.0% and 3.0% growth, respectively, during these years (United States Census Bureau, 2012). Despite slowed growth from 2008 to 2010, the Treasure Valley and Boise Metro Area remain among some of the fastest growing regions of the state over the past decade; they are expected to continue to be so over the coming decades (Bureau of Economic Analysis, 2010; Church, 2003).

In 2010, the population densities of both counties in the region were between 300-400 persons per square mile, with Ada County being more densely populated (373 persons per square mile) than Canyon County (322 persons per square mile) (United States Census Bureau, 2012). Both counties had substantially higher population densities than the state of Idaho as a whole (nineteen persons per square mile in 2010). In the case of Ada County, the high population density is largely due to the city of Boise, which accounted for over half (52%) of the county's 2010 populace (United States Census Bureau, 2012). Similarly, the cities of Nampa (81,557 residents) and Caldwell (46,237 residents) collectively accounted for 68% of the population of Canyon County in 2010 (United States Census Bureau, 2012). Rural areas are more sparsely populated than the data shown in Table 1.

Population Projections

Future population projections for the two-county area as well as the state of Idaho are characterized by in-migration over the next twenty years. The population of Idaho is expected to increase by 31% over the course of the next two decades, and, by 2030, it is projected to reach nearly two million (Church, 2003). During these years, Idaho is anticipated to be one of the fastest growing states, with growth rate projections consistently among the top ten in the nation (United States Census Bureau, 1996). In 2010, the most populated regions in Idaho included parts of the Treasure Valley and Boise Metro Regions (i.e., Ada and Canyon Counties) (United States Census Bureau, 2012). These regions, which correspond to some of the state's largest population centers (e.g., the cities of Boise, Nampa, Caldwell), are expected to remain the most populated areas statewide over the next two decades. The Treasure Valley and Boise Metro Region is expected to be the fastest growing region in the state over the next twenty years, with Valley, Boise, Ada, and Canyon Counties averaging a growth rate of 42% over this time horizon. The two counties that make up the study area are expected to remain among the fastest growing counties in the state, with Ada and Canyon Counties projected to be the first and eighth fastest growing counties statewide over the next two decades (Church, 2003).

Gender, Age and Racial Composition

In 2010, the median age of residents in Canyon County (31.6 years) was lower than the state median of 34.6 years and the Ada County median of 34.8 years (United States Census Bureau, 2012) (United States Census Bureau, 2012). In 2010, the racial demographics of Ada County were very similar to those of the state (Table 2). In Canyon County the percentage of Hispanic or Latino residents was approximately 13% higher while the percentage of white residents was 6% lower than the state average (United States Census Bureau, 2012).

Table 2. Racial Demographics for the State and Counties Near the Refuge (2010)

Area	**Idaho**	**Ada County**	**Canyon County**
	% of Total Population		
White alone	89.0%	90.3%	83.0%
Hispanic or Latino	11.2%	7.1%	23.9%
Two or more races	2.5%	2.9%	3.0%
Asian alone	1.2%	2.4%	0.8%
Black or African American alone	0.6%	1.1%	0.6%
American Indian and Alaska Native alone	1.4%	0.7%	1.0%
Native Hawaiian and other Pacific Islander alone	0.2%	0.2%	0.2%

Source: (United States Census Bureau, 2012)

Economic Conditions and Trends

Unemployment and Poverty

Since the early 1990s, trends in the unemployment rate in the state of Idaho have generally paralleled the national average, with unemployment trending downward in the late 1990s to reach levels below the national average by the mid-2000s before increasing again in the latter half of the same decade (Bureau of Labor Statistics, 2011a). The period of expansion in the early 2000s may be attributed to several factors, including the growth of several service industries, the continued development of the state's technology sector, and increasing demand for local government and construction services as the state's population continued to grow (Idaho Division of Financial Management, 2004). In 2008, Idaho's unemployment rate trended sharply upward as the state began to feel the recessionary effects of a sluggish national economy, with the construction, manufacturing, financial services, administrative and support services, and retail trade industries suffering the greatest job losses in the state's economy (Idaho Department of Labor, 2011c; Idaho Department of Labor, 2009). Since 1990, unemployment in the study area exhibited similar trends as statewide unemployment, with Ada County and Canyon County averaging unemployment rates of 4.0% and 5.8%, respectively, over the past two decades (Bureau of Labor Statistics, 2011a). Between 2008 and 2010, unemployment in the two-county area saw a sharp increase, particularly in Canyon County where the combined effects of slowed population growth, a struggling housing market, and rising lumber, concrete, and fuel prices decreased the local demand for labor (Idaho Department of Labor, 2011a).

Table 3 summarizes measures of unemployment, poverty, and income in the two-county area. In 2010, the median household income in Idaho as a whole was $43,490, which was about $6,500 lower than the national median household income of $50,046 (United States Census Bureau, 2012). Median household income in the region averaged $46,672, with the median income in Ada County ($50,612) being substantially higher than that in Canyon County ($42,732).

Table 3. Unemployment, Poverty, and Household Income for the State and Counties Near the Refuge

Area	Median Household Income 2010	Unemployment Rate 2010	Net Change in Unemployment Rate 2007-2010	Percent of Persons Below Poverty 2010
Idaho	$43,490 9.5%		6.5%	25.0%
Ada County	$50,612	8.9%	6.4%	29.8%
Canyon County	$42,732	11.3%	7.8%	16.2%

Source: United States Census Bureau, 2012

As shown in Table 3, poverty levels in Canyon County (16.2%) were below the state average of 25% in 2010. In contrast, poverty levels in Ada County (29.8%) were greater than the state average in 2010. The two-county area averaged 23% of its population below the 2010 poverty line (United States Census Bureau, 2012).

Employment and Income by Industry

Table 4 summarizes employment by industry for the two-county area. In 2009, total employment in the local area represented 339,730 jobs with about 77% of these jobs located in Ada County. Sixty percent of the total employment in the study area came from five main sectors (Bureau of Economic Analysis, 2010): professional, scientific, management, administration, and waste services; educational, health, and social services; retail trade; finance, insurance, real estate, and rental and leasing; and public administration. In 2008, the two largest employers in Ada County were Micron Technology and Hewlett Packard; these companies remain some of the largest local employers in Ada County (Ada County Accounting Department, 2008; Idaho Department of Labor, 2011b). In Canyon County, the largest local employers in the past decade have been in the education, manufacturing, health care, food processing, and wood processing sectors. These employers currently include the Caldwell and Nampa School Districts, the St. Alphonsus Medical Center, Plexus, the Amalgamated Sugar Company, and Woodgrain Milwork Incorporated (Idaho Department of Labor, 2011a; City of Nampa Department of Planning and Zoning, 2003).

Professional, scientific, management, administration, and waste services accounted for the largest percentage of total employment in the region, with 15.6% of total local employment coming from this sector. In the two-county area, most jobs in education, health, and social services (77%) and public administration (87%) were located in Ada County, which is home to both the state capital and Boise State University. These sectors were the second and fifth largest sectors of the local economy, respectively, and accounted for 13.1% and 10.3% of total employment in the combined two-county area (Bureau of Economic Analysis, 2010).

On the whole, farm employment accounted for a relatively small share (1.5%) of total employment in the region. Employment from this sector, however, did account for a larger share of total employment located in Canyon County (4% of total in-county employment) than Ada County (less than one percent). On the whole, Ada County was much less dependent on farm earnings (less than one percent of total in-county farm earnings) than the state as a whole, which had about 4.0% of its total earnings coming from farming; the opposite is true of Canyon County, which had 4.7% of its total earnings from farming (Bureau of Economic Analysis, 2010).

Table 4. Employment by Industry for the Counties Near the Refuge

	Ada County	**Canyon County**	**Two-County Area**
Total Employment (jobs) in 2009	**262,868**	**78,862**	**339,730**
Percent of Employment by Sector			
Professional, scientific, management, admin., and waste services	17%	9%	16%
Educational, health, and social services	13%	13%	13%
Retail trade	11%	13%	11%

Finance, insurance, real estate, and rental & leasing	11%	8%	10%
Public administration	10%	11%	10%
Arts, entertainment, recreation, accommodation, and food services	9%	6%	8%
Manufacturing 6%		10%	7%
Construction 6%		8%	7%
Other Services (except public administration) 5%		6%	5%
Wholesale trade	4%	3%	4%
Transportation and Warehousing	2%	4%	3%
Agriculture, forestry, fishing and hunting, and mining	1%	6%	2%
Information Services	2%	1%	2%

Source: (Bureau of Economic Analysis, 2010)

Land Use and Ownership Changes Surrounding Refuge Lands

Current Land Use

Idaho's Treasure Valley lies within a flat lowland known as the Snake River Plain. The Treasure Valley stretches across the southwest corner of the state and is bounded by the Boise Front Range to the northeast and the Owyhee Mountains to the southwest (Petrich, Wilkins, Tondee, & Morse, 2002). This valley closely coincides with the two-county study area, and it houses some of Idaho's largest metropolitan areas, including the cities of Boise, Caldwell, and Nampa, which collectively accounted for about 21% of the state's 2010 population (United States Census Bureau, 2012). As of 2008, about 30% of the land in the two-county area near the Refuge was federally owned, with the majority of federal land ownership accounted for by Bureau of Land Management holdings (21% of all land in the two-county area). About 65% of the land in the study area was privately owned and the remaining 4% was State-owned (Conservation Biology Institute, 2006 [data complied using the Economic Profile System-Human Dimensions Toolkit (EPS-HDT) developed by Headwaters Economics]).

Ada County is largely covered by grassland and shrubland, which account for about 75% of all land cover in the County. Mixed cropland is also prevalent, accounting for 17% of the land cover (NASA, 2006 [data complied using EPS-HDT]). As of 2008, urban development accounted for 6% of all land cover in the County, with the greater Boise area (i.e., the cities of Boise, Eagle, Garden City, Kuna, Meridian, and Star) accounting for 332,646 residents, or about 85% of the county's total 2010 population (United States Census Bureau, 2012). Land ownership in Ada County in 2008 was 49% private, 43% Federal, 7% State, and 1% under other ownership (*i.e.* Tribal, City, County, or Other) (Conservation Biology Institute, 2006 [data complied using EPS-HDT]).

Canyon County is less urbanized with about 3% of the county's land cover being urban development in 2008. Mixed croplands accounted for about 75% of the county's land cover, grassland accounted for 14%, and shrubland accounted for 4% (NASA, 2006 [data complied using EPS-HDT]). Water

accounted for an additional 2% of land cover in Canyon County with the majority of this coming from Lake Lowell, which covers a total of 14.5 square miles of the county's land (NASA, 2006 [data complied using EPS-HDT]; United States Bureau of Reclamation, n.d.). In 2010, the largest municipalities in Canyon County included Nampa (81,557 residents), Caldwell (46,237 residents), and Middleton (5,524 residents), which collectively accounted for about 34% of the county's total population (United States Census Bureau, 2012). Land ownership in Canyon County in 2008 was 93% private, 6% Federal, 5% State owned, and 1% under other ownership (*i.e.* Tribal, City, County, or Other) (Conservation Biology Institute, 2006 [data complied using EPS-HDT]).

Changes in Land Use

As populations grow, the spread of American cities across the rural landscape has several potential environmental impacts including, for example, decreased watershed permeability, increased noise and air pollution, and the loss of arable land and open spaces (McMahan, Weber, & Sauder, 2002). In addition to these environmental impacts, urban sprawl may have significant economic impacts on local communities through increased costs of public community services such as emergency response, infrastructure, or public works and utilities (Chen, 2000; Speir & Stephenson, 2002). Population growth in Idaho over the past decades has been cause for the continued conversion of rural lands to urban purposes. Between 1982 and 1997, Idaho ranked 35th in the nation for the most rural acres converted for urban growth purposes, with 205,000 acres of rural land being converted (Goodwin, 2003). About half (45%) of this transformation took place between 1992 and 1997, with over 27,000 of these acres occurring in the two-county study area during this five year period. Land conversion in Ada and Canyon Counties between 1992 and 1997 occurred faster than in any other region in Idaho, with Ada County converting land at a rate of 4,480 acres per year and Canyon County averaging 2,600 acres per year (United States Department of Agriculture, 2000). Between 1997 and 2007, an additional 130,100 acres of land was developed statewide, resulting in 557,600 total acres of developed land in Idaho and representing a 61% increase from 1982 levels (United States Department of Agriculture, 2009). These trends of urbanization and sprawl are likely to continue in the future as statewide and local area populations are projected to continue growing over the next few decades.

Economic Impacts of Current and Proposed Management Activities

Methods for a Regional Economic Impact Analysis

Economic input-output models are commonly used to determine how economic sectors will and will not be affected by demographic, economic, and policy changes. The economic impacts of the management alternatives for the Refuge were estimated using IMPLAN (Impact Analysis for

Planning), a regional input-output modeling system developed by the USDA Forest Service. IMPLAN is a computerized database and modeling system that provides a regional input-output analysis of economic activity in terms of 10 industrial groups involving more than four hundred economic sectors (Olson and Lindall, 1999). The IMPLAN model draws upon data collected by the Minnesota IMPLAN Group from multiple federal and state sources including the Bureau of Economic Analysis, Bureau of Labor Statistics, and the U.S. Census Bureau (Olson and Lindall, 1999). For the Refuge analysis, the year 2009 IMPLAN 3.0 data profiles for Ada and Canyon counties were used for the local area analysis. The IMPLAN county level employment data estimates were found to be comparable to the US Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System data for the year 2009.

Because of the way industries interact in an economy, activity in one industry affects activity levels in several other industries. For example, if more visitors come to an area, local businesses will purchase extra labor and supplies to meet the increase in demand for additional services. The income and employment resulting from visitor purchases from local businesses represent the *direct* effects of visitor spending within the economy. Direct effects measure the net amount of spending that stays in the local economy after the first round of spending; the amount that doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2007). In order to increase supplies to local businesses to meet increased demand, input suppliers must also increase their purchases of inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the *indirect* effects of visitor spending within the economy. Employees of the directly affected businesses and input suppliers use their incomes to purchase goods and services. The resulting increased economic activity from new employee income is the *induced* effect of visitor spending. The indirect and induced effects are known as the secondary effects of visitor spending. "Multipliers" (or "Response Coefficients") capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes, 1998). The sums of the direct and secondary effects describe the total economic impact of visitor spending in the local economy.

For each alternative, regional economic effects from the IMPLAN model are reported for the following categories:

- **Employment** represents the change in the number of jobs generated in the region from a change in regional output. IMPLAN estimates for employment include both full time and part time workers, which are measured in total jobs.
- **Labor Income** includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- **Value Added** measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

This economic impact analysis provides the potential economic effects associated with the implementation of the management alternatives for the Deer Flat National Wildlife Refuge. The CCP provides long range guidance and management direction to achieve the Refuge purposes over a 15-year timeframe. The planning team developed and analyzed four alternatives including current management. The economic impacts reported in this report are on an annual basis in 2011 dollars. Large management changes often take several years to achieve. The estimates reported for all the alternatives represent the final average annual economic effects after all changes in management have been implemented.

Impacts from Refuge Revenue Sharing

Under provisions of the Refuge Revenue Sharing (RRS) Act, local counties receive an annual payment for lands that have been purchased by full fee simple acquisition by the Service. Payments are based on the greater of 75 cents per acre or 0.75% of the fair market value of lands acquired by the Service. The exact amount of the annual payment depends on Congressional appropriations, which in recent years have tended to be less than the amount to fully fund the authorized level of payments. In fiscal year 2010 (FY10), actual RRS payments were 21% of authorized levels. FY10 RRS payments (made in 2011) totaled $4,547 to communities in Canyon County. Table 5 shows the resulting economic impacts of RRS payments under all alternatives. Accounting for both the direct and secondary effects, RRS payments for Alternatives 1, 2, 3, and 4 would generate total annual economic impacts of $1.9 thousand in labor income and $2.8 thousand in value added in the local two-county area.

Table 5. Annual Impacts from Refuge Revenue Sharing Payments for all Alternatives.

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternatives 1, 2, 3, and 4			
Direct effects	0	$1.4	$1.8
Secondary effects	0 $0	.5	$1.0
Total economic impact	0 $1	.9	$2.8

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The FWS report Banking on Nature: The Economic Benefits of National Wildlife Refuges

Visitation to Local Communities, estimated the impact of national wildlife refuges on their local economies (Carver and Caudill, 2007). According to the report, more than 34.8 million visits were made to national wildlife refuges in FY 2006 which generated $1.7 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by national wildlife refuge visitors generated nearly 27,000 jobs, and over $542.8 million in employment income (Carver and Caudill, 2007). Approximately eighty-two percent of total expenditures were from non-consumptive activities, twelve percent from fishing, and six percent from hunting (Carver and Caudill, 2007).

The priority "Big-Six" wildlife dependent uses are offered on the Lake Lowell Unit including: hunting, fishing, wildlife observation and photography, interpretation, and environmental education. Additionally, several other non-priority uses occur on the Refuge including non-wildlife dependent boating, swimming, jogging, and picnicking.

This section focuses on the regional economic impacts associated with Refuge visitation. Annual visitation estimates are based on several Refuge statistic sources including: visitors entering the Visitor Center/Office, counting vehicles at dispersed access sites, and general observation by Refuge personnel. Annual visitation estimates are on a per visit basis. Visitor spending profiles are estimated on an average per day (8 hours) basis. Because some visitors only spend short amounts of time visiting the Refuge, counting each visit as a full visitor day would overestimate the economic impact of Refuge visitation. In order to properly account for the amount of spending, the annual number of visits were converted to visitor days. Results from a recent visitor survey conducted during the summer of 2011(Sexton et. al., 2012) showed that Refuge visitors spend on average: five hours for fishing and non-wildlife dependent boating; four hours for swimming; and three hours for wildlife related non-consumptive activities (wildlife watching & photography, environmental education, and interpretation) and land-based non-wildlife dependent activities (walking, jogging, picnicking). Refuge personnel estimate that big game and waterfowl hunters spend six hours while upland game and other migratory bird hunters spend approximately 4 hours on the Refuge.

To determine the local economic impacts of visitor spending, only spending by persons living outside of the local two-county area are included in the analysis. The rationale for excluding local visitor spending is twofold. First, money flowing into Ada and Canyon counties from visitors living outside the local area (hereafter referred to as non-local visitors) is considered new money injected into the local economy. Second, if residents of the local two-county area visit the Refuge more or less due to the management changes, it is likely that they will correspondingly change the spending of their money elsewhere in that local area, resulting in no net change to the local economy. These are standard assumptions made in most regional economic impact analyses at the local level. However, it is possible that potential Refuge management actions that would restrict boating and other non-priority recreation at the Refuge could result in visitors from the local area shifting their expenditures from Canyon County to Ada County or possibly going outside of Ada and Canyon counties to boat and recreate at reservoirs outside of the two-county area. To address the contribution of local Refuge

visitation, Appendix A provides a contribution analysis of local visitor expenditures in the two-county area. Refuge personnel determined the percentage of non-local Refuge visitors based on . Table 6 shows the estimated percent of current Refuge visits and visitor days by visitor activity.

Table 6. Estimated Current Annual Refuge Visitation.

Visitor Activity	Total annual number of visits	Number of hours spent at the Refuge	Total annual number of visitor days[a]	Percentage of non-local visits (%)	Number of non-local visitor days[a]
Priority Uses:					
Fishing 4	5,300	5	28,313	7%	1,982
Big game hunting	75	6	56	8%	5
Waterfowl hunting	5,000	6	3,750	8%	300
Other migratory bird hunting (mourning dove)	100 4		50	8%	4
Upland game hunting	1,100	4	550	8%	44
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	55,900 3		20,963	10%	2,096
Non-priority uses:					0
Non-wildlife dependent boating	49,400	5	30,875	13%	4,014
Swimming and other beach activities	38,700	4	19,350	13%	2,516
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking))	27,800 3		10,425	13%	1,355
Total Visitation	*223,375*		*114,331*		*12,315*

[a]One visitor day = 8 hours.

The Refuge staff used several sources to project changes in visitation by activity over the next 15 years for each alternative. The Refuge staff estimated visitor projections based on the following considerations: Idaho and national visitation trend data; changes in recreational programs, facilities, and resources under each alternative; and changes observed in visitation at Deer Flat NWR over the last 10 years (Refuge staff experience/judgment). Table 7 shows projected annual average number of visits and visitor days for each activity and alternative.

Table 7. Annual Average Number of Refuge Visits and Visitor Days by Activity and Alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Total Visits				
Priority Uses:				
Fishing 48,430		48,430	23,260	12,710

Big game hunting	125	125	125	125
Waterfowl hunting	5,350	5,350	3,090	4,280
Other migratory bird hunting (mourning dove)	110	110	50	40
Upland game hunting	1,180	1,180	550	410
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	93,410 125,560		123,080	103,850
Non-priority uses:				
Non-wildlife dependent boating	55,080	50,040	21,480	0
Swimming and other beach activities	60,290	54,260	40,700	0
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	32,280 30,970		27,140	11,500
Total Annual Visits	*296,255*	*316,025*	*239,475*	*132,915*
Total Visitor Days				
Priority Uses:				
Fishing 30,269		30,269	14,538	7,944
Big game hunting	94	94	94	94
Waterfowl hunting	4,013	4,013	2,318	3,210
Other migratory bird hunting (mourning dove)	55	55	25	20
Upland game hunting	590	590	275	205
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	35,029 47,085		46,155	38,944
Non-priority uses:				
Non-wildlife dependent boating	34,425	31,275	13,425	0
Swimming and other beach activities	30,145	27,130	20,350	0
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	12,105 11,614		10,178	4,313
Total Visitor Days	*146,724*	*152,124*	*107,356*	*54,729*
Non-local Visitor Days				
Priority Uses:				
Fishing 2,119		2,119	1,018	556
Big game hunting	8	8	8	8
Waterfowl hunting	321	321	185	257
Other migratory bird hunting (mourning dove)	4	4	2	2
Upland game hunting	47	47	22	16
Non-Consumptive: wildlife watching & photography, environmental education, and Interpretation	3,503 4,709		4,616	3,894
Non-priority uses:				
Non-wildlife dependent boating	4,475	4,066	1,745	0
Swimming and other beach activities	3,919	3,527	2,646	0
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	1,574 1,510		1,323	561
Total Non-local Visitor Days	15,970 16,310		11,564	5,293

A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis we use average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill, 2007) that were derived from the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (U.S. Fish and Wildlife Service, 2007). The National Survey reports trip related spending of state residents and non-residents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person per-day expenditures by recreation activity for each FWS region. We used the spending profiles for nonresidents for FWS Region 1 (Region 1 includes Idaho), and updated the 2006 spending profiles to 2011 dollars using the Consumer Price Index Inflation Calculator. Average daily spending profiles for nonresident visitors to Region 1 for fishing ($65.98 per-day), big game hunting ($94.98 per-day), upland game hunting ($172.41 per-day) and waterfowl hunting ($192.73 per-day) were used to estimate non-local visitor spending for Refuge fishing and hunting related activities. The average daily nonresident spending profile for non-consumptive wildlife recreation (observing, feeding, or photographing fish and wildlife) ($121.59 per-day) was used for all non-consumptive wildlife viewing activities including non-priority swimming and beach activities and land-based non-wildlife dependent activities.

Banking on Nature does not include a spending profile for boating. To account for expenditures by boaters, it was assumed that boaters have similar expenditures to other non-consumptive wildlife recreators, but have additional fuel expenses to power their motor boats. Based on this assumption, the boater spending profile for this analysis was constructed by adding average daily boating fuel expenditure costs to the average daily nonresident spending profile for non-consumptive wildlife recreation from the Banking on Nature report. Average daily boating fuel expenditures per party were estimated by multiplying the average outboard fuel consumption for 2- and 4-stroke boats (3.2 gallons/hour; Nissan Marine, 2012) by the U.S. average conventional retail gasoline prices for the summer of 2011 (May-August) ($3.68; U.S. Energy Information Administration, 2012). Average daily boating fuel expenditures per person were then calculated by dividing average daily boating fuel expenditures per party by the average number of persons in a boating party (4 persons/party; Sexton et. al., 2012). This resulted in an average daily boating fuel expenditure of $23.57 per-day and total nonresident daily boating expenditures of $145.16 per-day.

Total spending by non-local Refuge visitors was determined by multiplying the average non-local visitor daily spending by the number of non-local visitor days at the Refuge. The economic impacts of each alternative were estimated using IMPLAN. Table 8 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 1. Under Alternative 1, non-local Refuge visitors would spend approximately $1.95 million in the local economy annually. This

spending would directly account for 19 jobs, $538.2 thousand in labor income, and $877.6 thousand in value added in the local economy. The secondary or multiplier effects would generate an additional 9 jobs, $309.6 thousand in labor income, and $546.2 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 1 would generate total economic impacts of 28 jobs, $847.8 thousand in labor income, and $1.4 million in value added.

Table 8. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 1.

Alternative 1	**Employment** (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	1	$36.4	$58.7
Secondary effects	1 $20.8		$36.6
Total effect	*2*	*$57.1*	*$95.3*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	1 $1	7.9	$28.6
Secondary effects	0 $9	.8	$17.3
Total effect	1 $2	7.6	$45.8
Non-Consumptive (wildlife watching & photography, env. education, and interpretation)			
Direct effects	4 $	111.4	$182.1
Secondary effects	2 $	67.7	$118.9
Total effect	*6*	*$179.1*	*$301.0*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	7 $	197.9	$322.6
Secondary effects	3 $	105.3	$187.0
Total effect	*10*	*$303.1*	*$509.6*
Swimming and other beach activities			
Direct effects	4 $	124.7	$203.8
Secondary effects	2 $	75.7	$133.0
Total effect	*6*	*$200.4*	*$336.8*
Land-based non-wildlife dependent (walking, jogging, and other activities, e.g., picnicking)			
Direct effects	2 $5	0.1	$81.8
Secondary effects	1 $3	0.4	$53.4
Total effect	*3*	*$80.5*	*$135.2*
Aggregate Non-local visitation			
Direct effects	19 $	538.2	$877.6
Secondary effects	9 $	309.6	$546.2
Total effect	*28*	*$847.8*	*$1,423.8*

Table 9 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 2. Under Alternative 2, non-local Refuge visitors would spend approximately $1.99 million in the local economy annually. This spending would directly account for 19 jobs, $543.9 thousand in labor income, and $887.1 thousand in value added in the local economy. The secondary or

multiplier effects would generate an additional 10 jobs, $314.4 thousand in labor income, and $554.6 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 2 would generate total economic impacts of 29 jobs, $858.4 thousand in labor income, and $1.4 million in value added.

Table 9. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 2.

Alternative 2	**Employment** (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	1 $3	6.4	$58.7
Secondary effects	1 $2	0.8	$36.6
Total effect	*2*	*$57.1*	*$95.3*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	1 $1	7.9	$28.6
Secondary effects	0 $9	.8	$17.3
Total effect	*1*	*$27.6*	*$45.8*
Non-Consumptive (wildlife watching & photography, env.l education, and interpretation)			
Direct effects	5 $	149.8	$244.8
Secondary effects	3 $	91.0	$159.8
Total effect	*8*	*$240.7*	*$404.7*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	6 $	179.8	$293.1
Secondary effects	3 $	95.6	$169.9
Total effect	*9*	*$275.4*	*$463.0*
Swimming and other beach activities			
Direct effects	4 $	112.2	$183.4
Secondary effects	2 $	68.1	$119.7
Total effect	*6*	*$180.3*	*$303.1*
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)			
Direct effects	2 $4	8.0	$78.5
Secondary effects	1 $2	9.2	$51.3
Total effect	*3*	*$77.2*	*$129.8*
Aggregate Non-local visitation			
Direct effects	19 $	543.9	$887.1
Secondary effects	10 $	314.4	$554.6
Total effect	*29*	*$858.4*	*$1,441.6*

Table 10 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 3. Under Alternative 3, non-local Refuge visitors would spend approximately $1.4 million in the local economy annually. This spending would directly account for 13 jobs, $377.8

thousand in labor income, and $616.6 thousand in value added in the local economy. The secondary or multiplier effects would generate an additional 6 jobs, $222.4 thousand in labor income, and $391.6 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 3 would generate total economic impacts of 19 jobs, $600.1 thousand in labor income, and $1 million in value added.

Table 10. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 3.

Alternative 3	**Employment** (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	1 $1	7.5	$28.2
Secondary effects	0 $1	0.0	$17.6
Total effect	*1*	*$27.4*	*$45.8*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	0 $1	0.1	$16.2
Secondary effects	0 $5	.5	$9.8
Total effect	*0*	*$15.6*	*$26.0*
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)			
Direct effects	5 $	146.8	$240.0
Secondary effects	3 $	89.2	$156.7
Total effect	*8*	*$236.0*	*$396.7*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	3 $	77.2	$125.8
Secondary effects	1 $4	1.1	$72.9
Total effect	*4*	*$118.2*	*$198.7*
Swimming and other beach activities			
Direct effects	3 $	84.1	$137.6
Secondary effects	1 $5	1.1	$89.8
Total effect	*4*	*$135.3*	*$227.4*
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)			
Direct effects	1 $4	2.1	$68.8
Secondary effects	1 $2	5.6	$44.9
Total effect	*2*	*$67.6*	*$113.7*
Aggregate Non-local visitation			
Direct effects	13 $	377.8	$616.6
Secondary effects	6 $	222.4	$391.6
Total effect	*19*	*$600.1*	*$1,008.2*

Table 11 summarizes the economic impacts associated with current non-local Refuge visitation by activity for Alternative 4. Under Alternative 4, non-local Refuge visitors would spend approximately

$631 thousand in the local economy annually. This spending would directly account for 5 jobs, $164.5 thousand in labor income, and $268.3 thousand in value added in the local economy. The secondary or multiplier effects would generate an additional 2 jobs, $98.7 thousand in labor income, and $173.5 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors for Alternative 4 would generate total economic impacts of 7 jobs, $263.2 thousand in labor income, and $441.8 thousand in value added.

Table 11. Average Annual Impacts of Non-Local Visitor Spending by Activity for Alternative 4.

Alternative 4	**Employment** (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Priority uses			
Fishing			
Direct effects	0 $9	.5	$15.4
Secondary effects	0 $5	.5	$9.6
Total effect	*0*	*$15.0*	*$25.0*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	0 $1	3.3	$21.2
Secondary effects	0 $7	.1	$12.7
Total effect	*0*	*$20.4*	*$33.9*
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)			
Direct effects	4 $	123.9	$202.5
Secondary effects	2 $	75.2	$132.2
Total effect	*6*	*$199.1*	*$334.7*
Non-priority uses			
Non-wildlife dependent boating			
Direct effects	0 $0	.0	$0.0
Secondary effects	0 $0	.0	$0.0
Total effect	*0*	*$0.0*	*$0.0*
Swimming and other beach activities			
Direct effects	0 $0	.0	$0.0
Secondary effects	0 $0	.0	$0.0
Total effect	*0*	*$0.0*	*$0.0*
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)			
Direct effects	1 $1	7.8	$29.2
Secondary effects	0 $1	0.8	$19.0
Total effect	*1*	*$28.7*	*$48.2*
Aggregate Non-local visitation			
Direct effects	5 $	164.5	$268.3
Secondary effects	2 $	98.7	$173.5
Total effect	*7*	*$263.2*	*$441.8*

Table 12 summarizes the total economic impacts associated with current non-local Refuge visitation by alternative. As shown in Table 12, the total annual average economic impacts for Alternative 2 would be similar to Alternative 1. The impacts for Alternative 3 would be approximately 30% less than the impacts for Alternative 1. Alternative 4 would have the largest decrease in impacts (approximately 70-75%) compared to Alternative 1.

Table 12. Average Annual Impacts of Non-Local Visitor Spending by Alternative.

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternative 1			
Direct effects	19 $	538.2	$877.6
Secondary effects	9 $	309.6	$546.2
Total economic impact	28 $	847.8	$1,423.8
Alternative 2			
Direct effects	19 $	543.9	$887.1
Secondary effects	10 $	314.4	$554.6
Total economic impact	29 $	858.4	$1,441.6
Alternative 3			
Direct effects	13 $	377.8	$616.6
Secondary effects	6 $	222.4	$391.6
Total economic impact	19 $	600.1	$1,008.2
Alternative 4			
Direct effects	5 $	164.5	$268.3
Secondary effects	2 $	98.7	$173.5
Total economic impact	7 $	263.2	$441.8

Impacts from Refuge Administration

Staff – Personal Purchases

Refuge employees reside and spend their salaries on daily living expenses in the local area, thereby generating impacts within the local economy. Household consumption expenditures consist of payments by individuals/households to industries for goods and services used for personal consumption. The IMPLAN modeling system contains household consumption spending profiles that account for average household spending patterns by income level. These profiles allow for leakage of household spending to outside the region. The IMPLAN household spending pattern for households

earning $35-50 thousand dollars per year was used to reflect the average salary of full-time permanent employees at the Refuge ($46,000 per year). Table 13 illustrates current Refuge staffing and additional positions needed under Alternatives 2, 3, and 4.

Table 13. Current Staffing and Additional Positions Needed to Implement the CCP.

Current Refuge Staff Positions (Alternative 1)
Refuge Manager
Assistant Refuge Manager
Visitor Services Manager
Wildlife Biologist
Maintenance Worker
Administrative Assistant
Office Aid
Youth Conservation Corps Leader (full-time seasonal)
Youth Conservation Corps (4 full-time seasonal positions)
Environmental Education Specialist (Intern)
Volunteer Coordinator (Intern)
Biological Science Technician (Intern)
Additional positions needed to implement the CCP (for Alt 2,3, 4)
*Biological Science Technician
*Environmental Education Specialist
*Volunteer Coordinator
Law Enforcement Officer

*If these positions were funded, the current interns would not be necessary.

Refuge personnel estimate that annual salaries total around $524.6 thousand for Alternative 1 and would increase to $711.1 thousand under Alternatives 2, 3, and 4. Table 14 shows the economic impacts associated with spending of salaries in the local two-county area by Refuge employees under all Alternatives. For Alternative 1, salary spending by Refuge personnel would generate additional secondary effects (i.e. additional non-refuge jobs in the local economy) of 4 jobs, $133.9 thousand in labor income, and $249.3 thousand in value added in the local economy. Alternatives 2,3, and 4 would generate additional secondary effects of 5 jobs, $181.5 thousand in labor income, and $338 thousand in value added in the local economy.

Table 14. Annual Local Impacts of Salary Spending by Deer Flat NWR Personnel for by Alternative.

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternative 1			

Direct effects	0 $0	.0	$0.0
Secondary effects	4 $	141.1	$254.7
Total economic impact	*4*	*$141.1*	*$254.7*
Alternatives 2, 3, and 4			
Direct effects	0 $0	.0	$0.0
Secondary effects	6 $	191.2	$345.2
Total economic impact	*6*	*$191.2*	*$345.2*

Work-related Purchases

A wide variety of supplies and services are purchased for Refuge operations and maintenance activities. Refuge purchases made in the local two-county area contribute to the local economic impacts associated with the Refuge. Major local expenditures include: supplies and services related to annual maintenance costs for trails, buildings and signage, and small equipment; auto repairs, parts, and fuel; and utilities. Current Refuge non-salary recurring expenditures average approximately $204.7 thousand per year. Average annual costs (including recurring costs and the annual average of one-time project costs over the life of the plan) are anticipated to increase by $83.8 thousand for Alternative 1, $397 thousand for Alternative 2, $832.8 thousand for Alternative 3, and $362.6 thousand for Alternative 4. Total average annual non-salary costs would total $288.5 thousand for Alternative 1, $601.7 thousand for Alternative 2, $1.04 million for Alternative 3, and $567.3 thousand for Alternative 4. The large increase in costs under Alternative 3 are related to the construction of a boardwalk. According to Refuge records, approximately 80% of the annual non-salary budget expenditures are spent on goods and services purchased in the local two-county area. Table 15 shows the economic impacts associated with work-related expenditures in local communities near the Refuge. For Alternative 1, work-related purchases would generate a total economic impact of 3 jobs, $122.9 thousand in labor income, and $179.3 thousand in value added. Work-related purchases under Alternative 3 would generate the largest total economic impact of 15 jobs, $536.6 thousand in labor income, and $734.4 thousand in value added.

Table 15. Local Economic Impacts of Refuge Related Purchases by Alternative

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Alternative 1			
Direct effects	2 $	76.5	$100.1
Secondary effects	1 $4	6.4	$79.2
Total economic impact	3 $	122.9	$179.3
Alternative 2			
Direct effects	5 $	177.4	$212.9
Secondary effects	3 $	103.7	$176.3

Total economic impact	8 $	281.1	$389.2
Alternative 3			
Direct effects	9 $	326.9	$385.5
Secondary effects	6 $	209.7	$348.9
Total economic impact	15 $	536.6	$734.4
Alternative 4			
Direct effects	4 $	165.4	$199.2
Secondary effects	3 $	95.1	$162.3
Total economic impact	7 $	260.5	$361.5

Summary of Economic Impacts for Alternative 1 (Status Quo)

Table 16 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 1. Under Alternative 1, management activities directly related to Refuge operations generate an estimated 21 jobs, $616.0 thousand in labor income, and $979.5 thousand in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities generate a total economic impact of 35 jobs, $1.1 million in labor income, and $1.8 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 1 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 16. Summary of all Refuge management activities for Alternative 1

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	2 $	77.8	$101.9
Total Effects	7	$265.9	$436.8
Non-local Public Use Activities			
Direct effects	19 $	538.2	$877.6
Total Effects	28 $	847.8	$1,423.8
Aggregate Impacts			
Direct effects	21 $	616.0	$979.5

Total effects	35 $1	,113.6	$1,860.7

[a.] Staff salary spending and work related purchases

Summary of Economic Impacts for Alternative 2 (Preferred Alternative)

Table 17 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 2. Under Alternative 2, management activities directly related to Refuge operations would generate an estimated 24 jobs, $722.7 thousand in labor income, and $1.1 million in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate a total economic impact of 43 jobs, $1.3 million in labor income, and $2.2 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 2 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 17. Summary of all Refuge management activities for Alternative 2

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	5 $	178.8	$214.7
Total Effects	14	$474.2	$737.3
Non-local Public Use Activities			
Direct effects	19 $	543.9	$887.1
Total Effects	29 $	858.4	$1,441.6
Aggregate Impacts			
Direct effects	24 $	722.7	$1,101.8
Total effects	43 $1	,332.6	$2,178.9

[a.] Staff salary spending and work related purchases

Table 18 summarizes the change in economic effects associated with Refuge operations under Alternative 2 as compared to Alternative 1. Due to increases in visitation and administration, Alternative 2 would generate 8 more jobs, $219.0 thousand more in labor income, and $318.3 thousand more in value added as compared to Alternative 1.

Table 18. Change in economic impacts under Alternative 2 compared to Alternative 1

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	(+) 3	(+) $100.9	(+) $112.8
Total Effects	(+) 7	(+) $208.4	(+) $300.5
Non-local Public Use Activities			
Direct effects	no change	(+) $5.7	(+) $9.5
Total Effects	(+) 1	(+) $10.6	(+) $17.8
Aggregate Impacts			
Direct effects	(+) 3	(+) $106.7	(+) $122.3
Total effects	(+) 8	(+) $219.0	(+) $318.3

[a.] Staff salary spending and work related purchases

Summary of Economic Impacts for Alternative 3

Table 19 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 3. Under Alternative 3, Refuge management activities directly related to Refuge operations would generate an estimated 22 jobs, $706.0 thousand in labor income, and $1.0 million in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate a total economic impact of 40 jobs, $1.3 million in labor income, and $2.1 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 3 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 19. Summary of all Refuge management activities for Alternative 3

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	9 $	328.3	$387.4
Total Effects	21	$729.8	$1,082.5
Non-local Public Use Activities			

Direct effects	13 $	377.8	$616.6
Total Effects	19 $	600.1	$1,008.2
Aggregate Impacts			
Direct effects	22 $	706.0	$1,003.9
Total effects	40 $1	,329.9	$2,090.7

[a.] Staff salary spending and work related purchases

Table 20 summarizes the change in economic effects associated with Refuge operations under Alternative 3 as compared to Alternative 1. Due to substantial increases in Refuge administration (including the construction of a boardwalk), Alternative 3 would generate 5 more jobs, $216.3 thousand more in labor income, and $230.0 thousand more in value added as compared to Alternative 1.

Table 20. Change in economic impacts under Alternative 3 compared to Alternative 1

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	(+) 7	(+) $250.4	(+) $285.5
Total Effects	(+) 14	(+) $463.9	(+) $645.6
Non-local Public Use Activities			
Direct effects	(-) 6	(-) $160.4	(-) $261.1
Total Effects	(-) 9	(-) $247.6	(-) $415.6
Aggregate Impacts			
Direct effects	(+) 1	(+) $90.0	(+) $24.4
Total effects	(+)5	(+) $216.3	(+) $230.0

[a.] Staff salary spending and work related purchases

Summary of Economic Impacts for Alternative 4

Table 21 summarizes the direct and total economic impacts in the two-county area of Refuge management activities for Alternative 4. Under Alternative 4, Refuge management activities directly related to Refuge operations would generate an estimated 9 jobs, $331.4 thousand in labor income, and $469.3 thousand in value added in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate a total economic impact of 20 jobs, $716.8 thousand in labor income, and $1.2 million in value added. In 2009, total labor income was estimated at $14.8 billion and total employment was estimated at 367.7 thousand jobs for the local two-county area (IMPLAN 2009 data). Thus, total economic impacts associated with Refuge operations under Alternative 4 represent less than .01 percent of total income and total employment in the overall two county area economy. Total economic effects of Refuge operations play a larger role in the communities in Canyon

County near the Refuge where most of the Refuge-related expenditures and public use related economic activity occurs.

Table 21. Summary of all Refuge management activities for Alternative 4

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	4 $	166.8	$201.0
Total Effects	13	$453.6	$709.5
Non-local Public Use Activities			
Direct effects	5 $	164.5	$268.3
Total Effects	7 $	263.2	$441.8
Aggregate Impacts			
Direct effects	9 $	331.4	$469.3
Total effects	20 $	716.8	$1,151.3

[a.] Staff salary spending and work related purchases

Table 22 summarizes the change in economic effects associated with Refuge operations under Alternative 4 as compared to Alternative 1. Due to substantial decreases in visitation, Alternative 4 would generate 15 less jobs, $396.8 thousand less in labor income, and $709.4 thousand less in value added as compared to Alternative 1.

Table 22. Change in economic impacts under Alternative 4 compared to Alternative 1

	Employment (# full & part time jobs)	Labor income (Thousands, $2011)	Value Added (Thousands, $2011)
Revenue Sharing & Refuge Administration[a]			
Direct effects	(+) 2	(+) $89.0	(+) $99.1
Total Effects	(+) 6	(+) $187.8	(+) $272.7
Non-local Public Use Activities			
Direct effects	(-) 14	(-) $373.7	(-) $609.3
Total Effects	(-) 21	(-) $584.6	(-) $982.1
Aggregate Impacts			
Direct effects	(-) 12	(-) $284.7	(-) $510.2
Total effects	(-) 15	(-) $396.8	(-) $709.4

[a.] Staff salary spending and work related purchases

References

Ada County Accounting Department, 2008, September 30, *Comprehensive Annual Financial Report*, accessed online February 27, 2012, at http://www.adaweb.net/LinkClick.aspx?fileticket=rZNNJeWZikQ%3D&tabid=1409

Bureau of Economic Analysis, 2010, *United States Department of Labor: Bureau of Labor Statistics*, accessed on line January 19, 2012, at http://www.bea.gov/regional/region/reis

Bureau of Labor Statistics, 2011a, *United States Department of Labor: Bureau of Labor Statistics, Achived New Releases*, accessed on line January 18, 2012, at http://www.bls.gov/schedule/archives/all_nr.htm#SRGUNE

Carver, E. & Caudill, J., 2007, Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation. U.S. Fish and Wildlife Service, Division of Economics, Washington, DC.

Cauchon, D., 2007, September 28, No End in Sight for Idaho's Growth, *USA Today*.

Chen, D. D., 2000, The Science of Smart Growth, *Scientific American*, 84.

Church, John, 2003, 2003 County Economic Forecast: Historic and Forcast County Population 2000-2003, Idaho Economics, accessed on line Jannuary 22, 2011, at http://www.epa.gov/ttn/naaqs/ozone/areas/pop/pop_proj.htm

City of Nampa Department of Planning and Zoning, 2003, *Employment, a*ccessed on line February 27, 2012, at http://www.cityofnampa.us/revitalization/economy/employment.pdf

Conservation Biology Institute, 2006, Protected Areas Database, compiled using Headwaters Economics Economic profile system-human dimensions toolkit

Goodwin, A., 2003, *Sprawl Threatens Quality of Life, Study Says, a*ccessed on line January 25, 2012, at spokesmanreview.com: http://www.spokesmanreview.com/news-story.asp?date=070703&ID=s1378246

Headwaters Economics, 2008, Economic profile system-human dimensions toolkit (EPS–HDT), available for download online at http://headwaterseconomics.org/tools/eps-hdt, downloaded September 05, 2011

Idaho Department of Labor, 2009, *Idaho Economic Update, a*ccessed on line January 25, 2012, at http://labor.idaho.gov/publications/EconUpdate_Sept_2009.pdf

Idaho Department of Labor, 2011a, *Canyon County: Work Force Trends,* Boise: Idaho Department of Labor.

Idaho Department of Labor, 2011b, *Ada County: Work Force Trends,* Boise: Idaho Department of Labor.

Idaho Department of Labor, 2011c, *Idaho's Job Recovery to Remain Slow in 2011,* Boise: Idaho Department of Labor.

Idaho Division of Financial Management, 2004, *Idaho Economic Forecast,* Boise: Idaho Division of Financial Management.

McMahan, J. B., Weber, K. T., & Sauder, J. D., 2002, Using Remotely Sensed Data in Urban Sprawl and Green Space Analyses, *Intermountain Journal of Sciences*, 30-37.

NASA, 2006, MODIS Land Cover Type, compiled using Headwaters Economics profile system-human dimensions toolkit

Nissan Marine, 2012, Nissan Outboard Fuel Consumption: accessed online March 1, 2012, at *http://www.nissanmarine.com/tech_talk/gas_mileage.html*

Olson, D., and Lindall, S., 1999, IMPLAN professional software, analysis and data guide: Minnesota IMPLAN Group, Inc.

Petrich, C., Wilkins, M., Tondee, C., & Morse, T., 2002, *Western Snake River Plain- Treasure Valley General Description, a*ccessed on line January 24, 2012, at http://imnh.isu.edu/digitalatlas/hydr/snakervr/wsrptvlg.htm

Sexton, N.R., Dietsch, A.M., Don Carlos, A.W., Koontz, L., Solomon, A. and Miller, H., 2012, National Wildlife Refuge visitor survey 2010/2011: Individual refuge results (Deer Flat): U.S. Geological Survey Data Series 643.

Speir, C., & Stephenson, K., 2002, Does Sprawl Cost Us All?: Isolating the Effects of Housing Patterns on PUblic Water and Sewer Costs. *Journal of the American Planning Association*, 56-70.

Stynes, D., 1998. Guidelines for measuring visitor spending: Department of Parks, Recreation and Tourism Resources, Michigan State University.

United States Bureau of Reclamation, n.d., *Lake Lowell, a*ccessed on line January 24, 2012, at http://www.recreation.gov/recAreaDetails.do?contractCode=NRSO&recAreaId=112&agencyCode=129

United States Census Bureau, 1996, *Population Projections for State by Age, Sex, Race, and Hispanic Origin: 1995 to 2025, a*ccessed on line January 23, 2012, at http://www.census.gov/population/www/projections/ppl47.html

United States Census Bureau, 2012, *American FactFinder 2, a*ccessed on line January 18, 2012, at American FactFinder 2: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

United States Department of Agriculture, 2000, *Idaho Natural Resource Trends, a*ccessed on line January 25, 2012, at ftp://ftp-fc.sc.egov.usda.gov/ID/news/nri_97.pdf

United States Department of Agriculture, 2009, *Summary Report: 2007 National Resources Inventory,* Washington D.C.: Natural Resourses Convervation Service and Center for Survey Statistics and Methodology.

United States Fish and Wildlife Service, 2007, *2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Idaho.* U.S. Census Bureau.

United States Energy Information Administration, 2012, Gasoline and Diesel Fuel Update: accessed online March 1, 2012, at http://www.eia.gov/petroleum/gasdiesel/

Appendix A

As mentioned in the Impacts from Public Use and Access Management section, when determining the economic impacts of visitor spending, only spending by non-locals are included in the analysis. This spending generates new income and employment, and has an economic impact on the region. Evaluating it shows the gain to the region from having the Refuge (Carver and Caudill, 2007). In this Appendix, total spending by both locals and non-locals is evaluated to show the significance of visitation to Deer Flat NWR to the local economy under Alternative 1 (Status Quo). As noted by

Carver and Caudill (2007), significance shows the economic activity in a region that is connected to Refuge activities, but does not reflect income and employment that would be lost if the Refuge were not a part of that economy.

Table A shows local and non-local visitation to Deer Flat NWR under Alternative 1. To capture spending by local visitors, we used the spending profiles in Carver and Caudill (2007) for residents for FWS Region 1 and update the 2006 spending profiles to 2011 dollars using the Consumer Price Index Inflation Calculator. Average daily spending profiles for resident visitors to Region 1 for fishing ($40.82 per-day), big game hunting ($41.15 per-day), upland game hunting ($40.54 per-day) and waterfowl hunting ($55.58 per-day) were used to estimate local visitor spending for Refuge fishing and hunting related activities. The average daily resident spending profile for non-consumptive wildlife recreation (observing, feeding, or photographing fish and wildlife) ($33.35 per-day) was used for all non-consumptive wildlife viewing activities including non-priority swimming and beach activities and land-based non-wildlife dependent activities. As described in the Impacts from Public Use and Access Management section, local boater expenditures were e by adding average daily boating fuel expenditure costs ($23.57 per-day) to the average daily resident spending profile for non-consumptive wildlife recreation ($33.35 per-day) from the Banking on Nature report. Total spending by local refuge visitors was determined by multiplying the average local visitor daily spending by the number of local visitor days at the Refuge.

Table A. Estimated Annual Deer Flat NWR Local and Non-local Visitation by Visitor Activity for Alternative 1

Alternative 1	**Total number of visits**	**Number of local visits**	**Number of non-local visits**	**Number local visitor days[a]**	**Number of non-local visitor days[a]**
Priority uses					
Fishing	48,430 4	5,040	3,390	28,150	2,119
Hunting (big game, waterfowl, and other migratory birds)	6,765	6,224 5	41	4,371	380
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)	93,410	84,069	9,341 3	1,526 3	,503
Non-priority uses					
Non-wildlife dependent boating	55,080	47,920	7,160 2	9,950 4	,475
Swimming and other beach activities	60,290	52,452	7,838 2	6,226 3	,919
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	32,280	28,084	4,196 1	0,531 1	,574
Total Visitation	296,255	263,788 3	2,467 1	30,754	15,970

[a] One visitor day = 8 hours

Table B summarizes the total economic significance associated with both local and non-local visitation under the status quo Alternative 1. Under Alternative 1, local and non-local Refuge visitors would spend a combined $7.3 million in the local economy annually. Accounting for both direct and secondary effects, spending by local and non-local visitors for Alternative 1 account for a total economic significance of 88 jobs, $3.3 million in labor income, and $5.5 million in value added in the local two-county area.

Table B. Total Annual Impacts of Local and Non-Local Visitor Spending for Alternative 1

	Employment (# full & part time jobs)	**Labor income** (Thousands, $2011)	**Value Added** (Thousands, $2011)
Local Spending			
Direct effects	55	$1,585.0	$2,566.4
Secondary effects	24	$825.8	$1,470.9
Total economic significance	79 $2	,410.8	$4,037.2
Non-local Spending			
Direct effects	19	$538.2	$877.6
Secondary effects	9	$309.6	$546.2
Total economic impact	28 $	847.8	$1,423.8
Total economic significance	*88*	*$3,258.5*	*$5,461.0*

Appendix N. Acronyms and Abbreviations

Act	National Wildlife Refuge System Improvement Act of 1997 (also Improvement Act or NWRSIA)
ADA	Americans with Disabilities Act
AFA	Acre Feet per Annum
AHM	Adaptive Harvest Management
AMA	Academy of Model Aeronautics
AQI	Air Quality Index
ARPA	Archaeological Resources Protection Act
Audubon	National Audubon Society
AUM	Animal Unit Month
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BIDEH	Biological Diversity, Integrity and Environmental Health
BLM	Bureau of Land Management
BMPs	Best Management Practices
Bti.	*Bacillus thuringiensis israelensis*
C.F.R.	Code of Federal Regulations
CCC	Civilian Conservation Corps
CCP	Comprehensive Conservation Plan
CCPRW	Canyon County Parks, Recreation, and Waterways
CD	Compatibility Determination
CEQ	White House Council on Environmental Quality
CFS	Cubic Feet per Second
CIG	Climate Impacts Group
CMP	Corridor Management Plan
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
DDE	Dichlorodiphenyldichloroethylene
DO	Dissolved Oxygen
DPS	Distinct Population Segment
E.O.	Executive Order
EE	Environmental Education
EIS	Environmental Impact Statement
ENSO	El Niño/Southern Oscillation
EPA	U.S. Environmental Protection Agency
EPS–HDT	Economic Profile System-Human Dimensions Toolkit
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FHBC	Fort Hall Business Council
Friends	Friends of Deer Flat Wildlife Refuge
FWS	U.S. Fish and Wildlife Service (also Service, USFWS)
FY	Fiscal Year
GHGs	Green House Gases
GIS	Geographic Information System
GPS	Global Positioning System
GSA	General Services Administration

ha	Hectare
HAER	Historic American Engineering Record
IBA	Important Bird Area
ICT	CCP Interagency Coordinating Team
IDAPA	Idaho Administrative Procedure Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDPR	Idaho Department of Parks and Recreation
IDWR	Idaho Department of Water Resources
IMPLAN	Impact Analysis for Planning
Improvement Act	National Wildlife Refuge System Improvement Act of 1997 (also Act, NWRSIA)
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
ISHS	Idaho State Historical Society
LCC	Landscape Conservation Cooperative
LDRA	Lower Dam Recreation Area
LE	Law Enforcement
LEIS	Legislative Environmental Impact Statement
MBCC	Migratory Bird Conservation Commission
MMS	Maintenance Management System
MOU	Memorandum of Understanding
MRA	Minimum Requirements Analysis
MSL	Mean Sea Level
NAGPRA	Native American Graves Repatriation Act
NAWMPC	North American Waterfowl Management Plan Committee
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSRE	National Survey on Recreation and the Environment
NTU	Nephelometric Turbidity Unit
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
PDO	Pacific Decadal Oscillation
PIF	Partners in Flight
PLO	Public Land Order
PM	Particulate Matter
PMU	Population Management Unit
ppm	Parts Per Million
PUP	Pesticide Use Proposal
Reclamation	Bureau of Reclamation
RM	River Mile
RMP	Resource Management Plan

RONS	Refuge Operating Needs System
RRS	Refuge Revenue Sharing Act
SCORTP	Statewide Comprehensive Outdoor Recreation and Tourism Plan
SDH	Southwest District Health
Service	U.S. Fish and Wildlife Service (also FWS, USFWS)
SGCN	Species of Greatest Conservation Need
SMU	Smoke Management Unit
SUP	Special Use Permit
SWID	Southwest Irrigation District
T and E	Threatened and Endangered
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service (also FWS, Service)
USG	Unhealthy for Sensitive Groups
USGCRP	U.S. Global Climate Change Research Program
USGS	U.S. Geological Survey
USHCN	U.S. Historical Climatology Network
VAOT	Vessels At One Time
VCS	Visitor Contact Station
VRM	Visual Resource Management
WPA	Works Progress Administration
WQS	Water Quality Standard
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area

Document continues on next page.

Appendix O. Glossary

Adaptive Management. The rigorous application of management, research, and monitoring to gain information and experience, necessary to assess and modify management activities. A process that uses feedback from refuge research, monitoring, and evaluation of management actions, to support or modify objectives and strategies at all planning levels. (Service Manual 602 FW 1.4)

Alternative. Different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission, and resolving issues (Service Manual 602 FW 1.6). The "no action" alternative is current refuge management, while the "action" alternatives are all other alternatives.

Anadromous. Fish that hatch and rear in fresh water, migrate to the ocean (salt water) to grow and mature, and migrate back to fresh water to spawn and reproduce. (www.streamnet.org/glossary.html)

Appropriate Use. A proposed or existing use on a refuge that meets at least one of the following four conditions:

(1) The use is a wildlife-dependent recreational use as identified in the Improvement Act.
(2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law.
(3) The use involves the take of fish and wildlife under State regulations.
(4) The use has been found to be appropriate as specified in section 1.11 of the USFWS Appropriate Use Policy. (603 FW 1)

Approved Acquisition Boundary. National wildlife refuge boundary approved by the National Fish and Wildlife Service Director for potential acquisition of lands by the Service.

Approved Refuge Boundary. A national wildlife refuge boundary approved by the National or Regional Fish and Wildlife Service Director. Within this boundary, the Service may negotiate with landowners to acquire lands not already owned by the Service. (Modified from Region 1 Landowner Guide, USFWS Division of Refuge Planning)

Archaeology. The scientific study of material evidence remaining from past human life and culture. (www.merriam-webster.com)

Avifaunal. All the birds present in a region, environment, or period of time. (Encarta Dictionary)

Benefiting Resources. Those species, species groups, or resources expected to benefit from actions taken for a **Resource of Concern**.

Big Six. Wildlife-dependent recreational uses under Refuge System Improvement Act include hunting, fishing, wildlife observation, photography, environmental education, and interpretation.

Bioaccumulation. A process where chemicals are retained in fatty body tissue and increase in concentration over time. (U.S. EPA Pesticide Glossary, http://epa.gov/pesticides/glossary/)

Biological Diversity (also Biodiversity). The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and communities and ecosystems in which

they occur (Service Manual 601 FW 3). The Refuge System's focus is on indigenous species, biotic communities, and ecological processes.

Biological Integrity. Biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities. (Service Manual 601 FW 3)

Biome. A division of the world's vegetation that corresponds to a defined climate and is characterized by specific types of plants and animals (e.g., tropical rain forest or desert). (Encarta Dictionary)

Birds of Conservation Concern. A category assembled by the U.S. Fish and Wildlife Service Division of Migratory Birds identifying the migratory and nonmigratory species (beyond those already designated as Federally threatened or endangered) that represent the Division's highest conservation priorities. (FWS, Division of Migratory Birds)

Board of Control; the Boise Project. Boise Project Board of Control and the Payette Division irrigation districts coordinate reservoir releases for irrigation, power generation, flood protection, municipal and industrial water use, recreation, water quality, and a healthy fishery. (Reclamation, www.usbr.gov/pn/project/boise_index.html)

Bureau of Reclamation. The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. (Reclamation, www.usbr.gov/library/glossary)

Candidate Species. Plant or animal species for which FWS or NOAA Fisheries has on file sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened. (FWS, Endangered Species Glossary, http://www.fws.gov/endangered/glossary.html)

Categorical Exclusion. A category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a Federal agency pursuant to the National Environmental Policy Act. (40 C.F.R. 1508.4)

Colonial (Nesting). A group of individuals that nest in the same area at the same time. Grebes, great blue herons, and gulls are examples of colonial nesting species at Deer Flat NWR. (www.fws.gov/birds/documents/whichbirdscolonial.pdf).

Compatibility Determination. A written determination signed and dated by the refuge manager and regional chief signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. The Director makes this delegation through the Regional Director. (Service Manual 603 FW 2)

Compatible Use. A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge (Service Manual 603 FW 2.6). A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.

Composition (Plant). The inventory of plant species found in any particular area.

Comprehensive Conservation Plan. A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purpose(s) of the refuge; helps fulfill the mission of the Refuge System; maintains and, where appropriate, restores the biological integrity, diversity, and environmental health of each refuge and the Refuge System; helps achieve the goals of the National Wilderness Preservation System, if appropriate; and meets other mandates. (Service Manual 602 FW 1.4)

Concern. See **Issue.**

Connectivity. The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. The opposite of **Habitat Fragmentation**.

Conservation Targets (also see **Resources of Concern; Priority Species, Species Groups,** and **Communities).** Term used by land management agencies and conservation organizations to describe the resources (ecological systems, ecological communities, species, species groups, or other natural resources) selected as the focus of conservation actions. (**Consumptive Use.** Recreational activities, such as hunting and fishing that involve harvest or removal of wildlife or fish, generally to be used as food by humans.

Contaminants or **Environmental Contaminants.** Chemicals present at levels greater than those naturally occurring in the environment resulting from anthropogenic or natural processes that potentially result in changes to biota at any ecological level (USGS Open File Report 99-108, Assessing Environmental Contaminant Threats to Lands Managed by the U.S. Fish and Wildlife Service). Pollutants that degrade other resources upon contact or mixing. (Adapted from Webster's II)

Cooperative Agreement. An official agreement between two parties.

Cover. The estimated percentage of an area, projected onto a horizontal surface, occupied by a particular plant species.

Cultural Resource Inventory. A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 C.F.R. 60.4. (Service Manual 614 FW 1.7)

Cultural Resources. The physical remains, objects, historic records, and traditional life ways that connect us to our nation's past. (FWS, Considering Cultural Resources, http://www.fws.gov/nativeamerican/graphics/Cultural_Resources_Overview.pdf)

Department of the Interior. The U.S. Department of the Interior serves as steward and guardian of the nation's natural resources and cultural heritage. It manages federal lands, such as national parks and refuges; honors the nation's trust responsibilities to tribal communities; and promotes conservation and wise use of natural resources. (U.S. Department of the Interior website)

Decadence. Marked by decay or decline. For plants, showing little or no new growth. (Adapted from Merriam-Webster online dictionary, www.merriam-webster.com)

Dichlorodiphenyldichloroethylene (DDE). A chemical compound formed by the loss of hydrogen chloride (dehydrohalogenation) from DDT, of which it is one of the more common breakdown products. DDT is an organochlorine pesticide that was once widely used to control insects on agricultural crops. Consuming large amounts of DDT over a short time would most likely affect the nervous system. (Public Health Statement of the Agency for Toxic Substances and Disease Registry, Centers for Disease Control)

Direct Loss. Loss of food or loss of habitat as nonnative species out-compete native species.

Distinct Population Segment (DPS). A subdivision of a vertebrate species that is treated as a species for purposes of listing under the Endangered Species Act. To be so recognized, a potential distinct population segment must satisfy standards specified in a FWS or NOAA Fisheries policy statement (See the February 7, 1996, Federal Register, pages 4722-4725). The standards require it to be separable from the remainder of and significant to the species to which it belongs. (FWS, Endangered Species Glossary, http://www.fws.gov/endangered/glossary.html)

Disturbance. Significant alteration of habitat structure or composition, or of the behavior or wildlife. May be natural (e.g., fire) or human-caused events. (e.g., aircraft overflight).

East Pool. That part of Lake Lowell that is east of the Narrows (see Map 3).

Ecosystem. A dynamic and interrelating complex of plant and animal communities and their associated nonliving environment.

Ecosystem Management. Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.

Elevation. The elevation above sea level of the surface water at Lake Lowell.

Endangered Species (Federal). An animal or plant species in danger of extinction throughout all or a significant portion of its range. (FWS, Endangered Species Glossary, http://www.fws.gov/endangered/glossary.html)

Endangered Species (State). A plant or animal species in danger of becoming extinct or extirpated in a state within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

Enhance. To improve the condition of an area or habitat, usually for the benefit of certain native species.

Environmental Assessment (EA). A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact. (40 C.F.R. 1508.9)

Environmental Education Study Sites. Outdoor locations where groups of students engage in hands-on activities within an environmental education curriculum.

Environmental Health. Composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment. (Service Manual 601 FW 3)

Environmental Impact Statement (EIS). A detailed written statement required by Section 102(2)(C) of the National Environmental Policy Act, analyzing the environmental impact of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short term uses of the environment versus the maintenance and enhancement of long-term productivity and any irreversible and irretrievable commitment of resources. (Adapted from 40 C.F.R. 1508.11 and 42 U.S.C. 4332)

Ethnography. The study and systematic recording of human cultures; also: a descriptive work produced from such research.

Executive Order. A President's or Governor's declaration which has the force of law, usually based on existing statutory powers, and requiring no action by the Congress or state legislature.

Experimental Population. A population (including its offspring) of a listed species designated by rule published in the Federal Register that is wholly separate geographically from other populations of the same species. An experimental population may be subject to less stringent prohibitions than are applied to the remainder of the species to which it belongs. (FWS, Endangered Species Glossary, http://www.fws.gov/endangered/glossary.html)

Finding of No Significant Impact (FONSI). A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a Federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared. (40 C.F.R. 1508.13)

Fluviatile. Belonging to, existing in or about, or produced by the action of streams or rivers. (Webster's Third New International Dictionary Unabridged online)

Focal Conservation Target. A suite of conservation targets that for purposes of planning are sorted and condensed to represent threats to biological integrity diversity and environmental health at the refuge level.

Goal. Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units. (Service Manual 602 FW 1.6)

Habitat. Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.

Habitat Fragmentation. The division of continuous patches into smaller pieces which are partly or fully disconnected from one another by infrastructure, agricultural fields, or human settlements (www.biology-online.org). The opposite of **Connectivity.**

Habitat Management Plan. A plan that provides refuge managers a decision-making process; guidance for the management of refuge habitat; and long-term vision, continuity, and consistency for habitat management on refuge lands. (Service Manual 620 FW 1.4)

Habitat Restoration. Management emphasis designed to move ecosystems to desired conditions and processes and/or to healthy ecosystems.

Herptiles. A general term for amphibians and reptiles.

Historic Conditions. Composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human-related changes to the landscape. (Service Manual 601 FW 3)

Hydrology. study of the occurrence, distribution, movement and properties of the waters of the earth and their relationship with the environment within each phase of the water cycle (USGS website http://ga.water.usgs.gov/edu/hydrology.html).

Hydrophytic. Hydrophytic vegetation is the community of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (U.S. Army Corps of Engineers Wetland Delineation Manual).

Hypolimnion. The lower zone of a thermally stratified lake, below the thermocline, and usually depleted in oxygen during summer stagnation. (www.streamnet.org/glossary.html)

Important Bird Area. A site that provides essential habitat for one or more species of bird and that is recognized as being important on a global, continental, or state level.

Indicator. A measurable characteristic of a key ecological attribute that strongly correlates with the status of the key ecological attribute, something that serves as a sign or symptom.

Inholding. Refers to lands within an **Approved Refuge Boundary** that are not owned by the U.S. Fish and Wildlife Service. These can be private lands or lands owned by City, County, State, or other Federal agencies.

Integrated Pest Management (IPM). The use of pest and environmental information in conjunction with available pest control technologies to prevent unacceptable levels of pest damage by the most economical means and with the least possible hazard to persons, property, and the environment. (U.S. EPA Pesticide Glossary, http://epa.gov/pesticides/glossary/f-l.html#i)

Interpretation. A teaching technique that combines factual information with stimulating explanation, frequently used to help people understand natural and cultural resources. (www.yourdictionary.com)

Invasive. Nonnative species disrupting and replacing native species. (www.thebiotechdictionary.com)

Inventory. A survey of the plants or animals inhabiting an area.

Inviolate Sanctuary. Management purpose for migratory birds under the Migratory Bird Conservation Act (16 U.S.C. 715d).

Issue. Any unsettled matter that requires a management decision (e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition). (Service Manual 602 FW 1.6)

Key Ecological Attributes. Those aspects of the environment, such as ecological processes or patterns of biological structure and composition that are critical to sustain the long-term viability of the target. These key ecological attributes are further divided into measurable indicators.

Lacustrine. Pertaining to, produced by, or inhabiting a lake. (U.S. EPA, Terms of Environment)

Macrophyte. A macroscopic plant, commonly used to describe aquatic plants that are large enough to be visible to the naked eye. (www.biology-online.org)

Maintenance. The upkeep of constructed facilities, structures, and capitalized equipment necessary to realize the originally anticipated useful life of a fixed asset. Maintenance includes preventative maintenance; cyclic maintenance; repairs; replacement of parts, components, or items of equipment, periodic condition assessment; periodic inspections, adjustment, lubrication and cleaning (non-janitorial) of equipment; painting, resurfacing, rehabilitation; special safety inspections; and other actions to assure continuing service and to prevent breakdown.

Maintenance Management System (MMS). A national database of refuge maintenance needs and deficiencies. It serves as a management tool for prioritizing, planning, and budgeting purposes. (RMIS descriptions)

Methylmercury. CH_3Hg+, organic form of mercury and the form of mercury that is most easily bioaccumulated in organisms; a neurotoxin. Methylmercury can accumulate up the food chain in aquatic systems and lead to high concentrations in fish, which, when consumed by humans, can result in an increased risk of adverse effects in highly exposed or sensitive populations. (USGS, Toxic Substances Hydrology Program)

Migration. The seasonal movement from one area to another and back.

Migratory Birds. Those species of birds listed under 50 C.F.R. 10.13. (Service Manual 720 FW 1)

Monitoring. The process of collecting information to track changes of selected parameters over time.

National Environmental Policy Act of 1969 (NEPA). Requires all Federal agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making. (40 C.F.R. 1500)

National Register of Historic Places (NRHP). The nation's master inventory of known historic properties administered by the National Park Service. Includes buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archeological, or cultural significance at the national, state, and local levels. (USFWS, Considering Cultural Resources, http://www.fws.gov/nativeamerican/graphics/Cultural_Resources_Overview.pdf)

National Wildlife Refuge. A designated area of land, water, or an interest in land or water within the Refuge System, excluding coordination areas. (Service Manual 601 FW 1.3)

National Wildlife Refuge System. Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; game ranges; wildlife management areas; or waterfowl production areas.

National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57**).** A Federal law that amended and updated the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee, et seq.).

Native. With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem. (Service Manual 601 FW 3)

NephelometricTurbidity Unit (NTU). A unit measuring the lack of clarity of water, used by water and sewage treatment plants, in marine studies, and so on. Water containing 1 milligram of finely divided silica per liter has a turbidity of 1 NTU.

Nonconsumptive Recreation. Recreational activities that do not involve harvest, removal, or consumption of fish, wildlife, or other natural resources.

Noxious Weed. A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive or difficult to manage; parasitic; a carrier or host of serious insect or disease; or nonnative, new, or not common to the United States. According to the Federal Noxious Weed Act (Public Law 93-629), a noxious weed is one that causes disease or had adverse effects on humans or their environment and therefore is detrimental to the agriculture and commerce of the United States and to public health.

Objective. A concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Objectives should be attainable, time-specific, and measurable. (Service Manual 620 FW 1)

Obligate Species. A plant or animal that occurs only in a narrowly defined habitat such as a tree cavity, rock cave, or wet meadow. (www.streamnet.org/glossary.html)

Operations. Activities related to the normal performance of the functions for which a facility or item of equipment is intended to be used. Costs such as utilities (electricity, water, sewage) fuel, janitorial services, window cleaning, rodent and pest control, upkeep of grounds, vehicle rentals, waste management, and personnel costs for operating staff are generally included within the scope of operations.

Organochlorines. Compounds that contain carbon, chlorine, and hydrogen. Their chlorine-carbon bonds are very strong, which means that they do not break down easily. They are highly insoluble in water, but are attracted to fats. Since they resist metabolism and are readily stored in fatty tissue of any animal ingesting them, they accumulate in animals in higher trophic levels. (USFWS, Pacific

Region Ecological Services, http://www.fws.gov/Pacific/ecoservices/envicon/pim/reports/contaminantinfo/contaminants.html)

Otoliths. A structure of the inner ear of vertebrates. In fish, this structure is used for balance, orientation, and sound detection. The otoliths of fish provide useful information on age, growth rate, life history, recruitment, and taxonomy of individuals (Alaska Department of Fish and Game, http://tagotoweb.adfg.state.ak.us/oto/).

Outreach. The process of providing information to the public on a specific issue through the use of the media, printed materials, and presentations.

Pacific Flyway. One of several major north-south travel corridors for migratory birds. The Pacific Flyway is west of the Rocky Mountains.

Palustrine. Pertaining to a marsh or wetlands; wet or marsh habitats. (U.S. EPA, Terms of Environment)

Passerine. Of or relating to the largest order (Passeriformes) of birds, which includes over half of all living birds; birds having feet that are adapted for perching, including all songbirds. (www.OxfordDictionaries.com)

Permanent Wetland. Characterized by saturated soil and shallow ponding of water (6 inches deep) throughout winter and early spring.

Piscivorous. Habitually feeding on fish; fish-eating.

Planning Team. The primary U.S. Fish and Wildlife staff and others who played a key role in developing and writing a CCP. Planning teams are interdisciplinary in membership and function. Teams generally consist of a Planning Team Leader, Refuge Manager, staff biologists, a state natural resource agency representative, and other appropriate program specialists (e.g., social scientist, ecologist, recreation specialist). Other Federal and Tribal natural resource agencies are asked to provide team members, as appropriate. The planning team prepares the CCP and appropriate NEPA documentation. (Service Manual 602 FW 1.6)

Plant Association. A classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community **Plant Community.** An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community.

Preferred Alternative. This is the alternative determined (by the decision maker) to best achieve a refuge's purpose, vision, and goals; to best contribute to the Refuge System mission; to best address the significant issues; and to be consistent with principles of sound fish and wildlife management.

Preplanning. The first phase of comprehensive conservation planning process. It includes identifying the planning area and data needs; establishing the planning team and planning schedule; reviewing available information; preparing a public involvement plans and conducting internal scoping.

Priority Public Uses. Hunting, fishing, wildlife observation and photography, environmental education and interpretation, where compatible, are identified under the National Wildlife Refuge System Improvement Act of 1997 as the six priority public uses of the National Wildlife Refuge System.

Propagule. A structure (such as a cutting, a seed, or a spore) that propagates a plant.

Public. Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the **Planning Team**. It includes those who may or may not have indicated an interest in Service issues and those who may be affected by Service decisions.

Public Land Order. Public lands consist of that class of land remaining from the original public domain that was acquired by the United States by treaty, purchase, or cession from a foreign power.

Quality Hunt. Each refuge includes input during development of a CCP that helps define and evaluate wildlife-dependent recreation programs such as hunting and contains the following attributes:

(1) Minimizes conflicts with neighboring landowners;
(2) Promotes accessibility and availability to a broad spectrum of the American people;
(3) Promotes resource stewardship and conservation;
(4) Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources;
(5) Provides reliable/reasonable opportunities to experience wildlife;
(6) Uses facilities that are accessible to people and blend into the natural setting; and
(7) Uses visitor satisfaction to help define and evaluate programs.

Refuge Operating Needs System (RONS). A national database of unfunded refuge operating needs required to meet and/or implement station goals, objectives, management plans, and legal mandates. It is used as a planning, budgeting, and communication tool describing funding and staffing needs of the Refuge System.

Refuge Purpose(s). The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit. For refuges that encompass congressionally designated wilderness, the purposes of the Wilderness Act are additional purposes of the refuge. (Service Manual 602 FW 1.6)

Resource of Concern (ROC). All plant and/or animal species, species groups, or communities specifically identified in refuge purpose(s), System mission, or international, national, regional, state, or ecosystem conservation plans or acts. For example, waterfowl and shorebirds are a resource of concern on a refuge whose purpose is to protect "migrating waterfowl and shorebirds." Federal or state threatened and endangered species on that same refuge are also a resource of concern under terms of the respective endangered species acts. (Service Manual 620 FW 1.4)

Restore. To bring back to a former or original condition. (Webster's II)

Salmonid. A bony soft-finned fish of the family Salmonidae, Order Salmoniformes, that includes salmon, trout, whitefish, and char. (Encarta Dictionary)

Scoping. A stage in the development of a CCP in which a refuge uses news releases, and other appropriate media to notify the public of the opportunity to participate in the planning process and to help identify issues, concerns, and opportunities related to the project.

Species of Concern (Federal). An informal term referring to a species that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing. (FWS, Endangered Species Glossary, http://www.fws.gov/endangered/glossary.html)

Step-down Management Plan. A plan that provides specific guidance on management subjects (e.g., habitat, public use, fire, safety) or groups of related subjects. It describes strategies and implementation schedules for meeting CCP goals and objectives. (Service Manual 602 FW 1.6)

Strategy. A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives. (Service Manual 602 FW 1.6)

Stress. The impairment or degradation of a key ecological attribute for a conservation target. (TNC 2000)

Threatened Species (Federal). An animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. (FWS, Endangered Species Glossary, http://www.fws.gov/endangered/glossary.html)

Threatened Species (State). A plant or animal species likely to become endangered in a state within the near future if factors contributing to population decline or habitat degradation or loss continue.

Traditional Cultural Property. A historic property that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. (National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties)

Transmissivity. The rate which groundwater flows horizontally through an aquifer.

Trophic. A position in a food chain occupied by a group of organisms with similar feeding mode. (www.biology-online.org)

Trust Species. A resource such as endangered species or migratory birds and fish that the government holds in trust for the people through law or administrative act. Federal trust species include threatened and endangered species, as well as migratory birds (e.g., waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Upland. Any area that does not meet the definition of a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic

characteristics associated with wetlands. (U.S. Army Corps of Engineers Wetland Delineation Manual)

Vegetation Type (Also Habitat Type, **Forest Cover Type).** A land classification system based upon the concept of distinct plant associations.

Vision Statement. A concise statement of what the planning unit should be, or what we hope to do, based primarily upon the Refuge System mission and specific refuge purposes, and other mandates. The vision statement for the refuge is tied to the mission of the Refuge System; the purpose(s) of the refuge; the maintenance or restoration of the ecological integrity of each refuge and the Refuge System; and other mandates. (Service Manual 602 FW 1.6)

Waterfowl. Resident and migratory ducks, geese, and swans.

Water Quality. A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Watershed. The land area that drains water to a particular stream, river, or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large watersheds, like the Mississippi River Basin, contain thousands of smaller watersheds.

West Pool. That part of Lake Lowell that is west of the Narrows (see Map 3).

Wetlands. Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water at some time during the growing season of each year. (Service Manual 660 FW 2; Cowardin et al. 1979)

Wildlife-dependent Recreational Use. A use of a refuge involving hunting, fishing, wildlife observation, photography, environmental education, or interpretation. These are the six priority public uses of the Refuge System as established in the National Wildlife Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife. The Service will also consider these other uses in the preparation of refuge CCPs; however, the six priority public uses always will take precedence. (Service Manual 602 FW 1.6)

Appendix P. References Cited

This appendix contains all references cited in Chapters 1 through 6. References for citations located within the appendices (A-O) are located within each individual appendix, and are not duplicated in the following list.

Ada County Accounting Department. 2008. Comprehensive annual financial report, September 30, 2008. Available at: http://www.adaweb.net/LinkClick.aspx?fileticket=rZNNJeWZikQ%3D&tabid=1409. Accessed February 27, 2012.

Adkison, G.P. and M.T. Jackson. 1996. Changes in ground-layer vegetation near trails in midwestern U.S. forests. Natural Areas Journal 16:14-23.

Alcock, J. 1993. Animal behavior: an evolutionary approach. 5th ed. Sunderland, MA: Sinauer Associates.

Allen, E.B., ed. 1988. The reconstruction of disturbed arid lands: an ecological approach. Boulder, CO: Westview Press.

Allen, J.H., G.L. Nuechterlein, and D. Buitron. 2008. Weathering the storm: how wind and waves impact western grebe nest placement and success. Waterbirds 31(3):402-410 (doi: 10.1675/1524-4695-31.3.402).

Andelman S., K. Gillem, C. Groves, C. Hansen, J. Humke, T. Klahr, L. Kramme, B. Moseley, M. Reid, D. Vander Schaaf, M. Coad, C. Deforest, C. Macdonald, J. Baumgartner, J. Hak, C. Hansen, S. Hobbs, L. Lunte, L. Smith, and C. Soper. 1999. The Columbia Plateau ecoregional assessment: a pilot effort in ecoregional conservation. The Nature Conservancy. Available at: http://waconservation.org/projects/ecoregions/. Accessed May 18, 2012.

Angelstam, P. 1997. Landscape analysis as a tool for the scientific management of biodiversity. Ecological Bulletins 46:140-170.

Apfelbaum, S.I. 1985. Cattail (*Typha* spp.) management. Natural Areas Journal 5:9-17.

Asplund, T.R. 2000. The effects of motorized watercraft on aquatic ecosystems. Wisconsin Department of Natural Resources, Bureau of Integrated Science. Services and University of Wisconsin, Water Chemistry Program. Madison, WI. 21 pp.

Audubon. 2012. Idaho's Important Bird Areas program. Available at: http://iba.audubon.org/iba/viewState.do?state=US-ID and http://iba.audubon.org/iba/viewSiteProfile.do?siteId=551&navSite=state Accessed May 18, 2012.

Auld, J.W. 2001. Consumers, cars, and communities: the challenge of sustainability. International Journal of Consumer Studies 25:228-237.

Baker, W.L. 2006. Fire and restoration of sagebrush ecosystems. Wildlife Society Bulletin 34(1):177-185.

Banks, P.B. and J.V. Bryant. 2007. Four-legged friend or foe? Dog walking displaces native birds from natural areas. Biology Letters 2007(3):611-613.

Bartelt, G.A. 1987. Effects of disturbance and hunting on the behavior of Canada goose family groups in east central Wisconsin. Journal of Wildlife Management 51:517-522.

Beckham, S.D. 1995. An interior empire: historical overview of the Columbia Basin. Submitted to Eastside Ecosystem Management Project. Lake Oswego, OR: Stephen Dow Beckham. 150 pp.

Belanger, L. and J. Bedard. 1989. Responses of staging greater snow geese to human disturbance. Journal of Wildlife Management 53(3):713-719.

Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

Belanger, L. and J. Bedard. 1995. Hunting and waterfowl. Pages 243-256 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Belnap, J. and D. Eldridge. 2001. Disturbance and recovery of biological soil crusts. Pages 363-383 in: J. Belnap and O.L. Lange, eds. Biological soil crusts: structure, function, and management. New York: Springer-Verlag.

Belnap, J. and O.L. Lange, eds. 2001. Biological soil crusts: structure, function, and management. New York: Springer-Verlag.

Benninger-Truax, M., J.L. Vankat, and R.L. Schaefer. 1992. Trail corridors as habitat and conduits for movement of plant species in Rocky Mountain National Park, CO. Landscape Ecology 6(4):269-278.

Berg, G., L. Wilkinson, H. Wollis, and D. Prescott. 2004. Western (*Aechmophorous occidentalis*) and eared (*Podiceps nigricollis*) grebes of Central Alberta: 2004 field summary. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 94. Edmonton, Alberta.

BLM (Bureau of Land Management). 1999. Owyhee resource management plan (RMP). U.S. Department of the Interior BLM Lower Snake River District Office. Boise, ID. 140 pp.

BLM. 2001. Southeast Oregon resources management plan and record of decision. U.S. Department of the Interior BLM Vale District Office. Vale, OR. 714 pp.

BLM. 2002. Management considerations for sagebrush (*Artemisia*) in the western United States: a selective summary of current information about the ecology and biology of woody North American sagebrush taxa. USDI Bureau of Land Management. Washington, D.C. 73 pp.

BLM. 2008. Four Rivers Field Office analysis of the management situation. U.S. Department of the Interior BLM Boise District Office. Boise, ID. 303 pp.

BLM. 2010. Public land statistics. Available at: http://www.blm.gov/public_land_statistics/. Accessed May 18, 2012.

Bouffard, S.H. 1982. Wildlife values versus human recreation: Ruby Lake National Wildlife Refuge. Transactions of the North American Wildlife and Natural Resources Conference 47:553-558.

Bowker, J.M., D.B.K. English, and H.K. Cordell. 1999. Projections of outdoor recreation participation to 2050. Pages 323-350 in: H.K. Cordell, C. Betz, J.M. Bowker, B.K. Donald, S.H. Mou, J.C. Bergstrom, R.J. Teasley, M.A. Tarrant, and J. Loomis, eds. Outdoor recreation in American life: a national assessment of demand and supply trends. Champaign, IL: Sagamore Publishing.

Bowles, A.E. 1995. Responses of wildlife to noise. Pages 109-156 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Boyle, S.A. and F.B. Samson. 1985. Effects of nonconsumptive recreation on wildlife: a review. Wildlife Society Bulletin 13:110-116.

Brooks, M.L. and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Tall Timbers Research Station Miscellaneous Publication 11:1-14.

Brown, S., C. Hickey, B. Harington, and R. Gill, eds. 2001. United States shorebird conservation plan, 2nd ed. Manomet Center for Conservation Sciences. Manomet, MA. 64 pp.

Bruening, S. 2002. Animal diversity web: *Lithobates catesbeianus*. Available at: http://animaldiversity.ummz.umich.edu/site/accounts/information/Lithobates_catesbeianus.html. Accessed May 1, 2012.

Bunnell, F.L., I. Houde, B. Johnston, and E. Wind. 2002. How dead trees sustain live organisms in western forests. General Technical Report PSW-GTR-181. USDA Forest Service. 28 pp.

Bunting, S.C., J.L. Kingery, and M.A. Schroeder. 2003. Assessing the restoration potential of altered rangeland ecosystems in the interior Columbia Basin. Ecological Restoration 21:77-86.

Burch, S. and T. Koch. 2006. Nationwide malformed amphibian survey project Deer Flat National Wildlife Refuge, Idaho. Final report for FY 2005. Snake River Fish and Wildlife Office, USFWS. Boise, ID. 6 pp.

Bureau of Economic Analysis. 2010. United States Department of Labor: Bureau of Labor statistics. Available at: http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=5. Accessed October 22, 2012.

Bureau of Labor Statistics. 2011. United States Department of Labor: Bureau of Labor Statistics archived news releases. Available at: http://www.bls.gov/schedule/archives/all_nr.htm#SRGUNE. Accessed January 18, 2012.

Burger, A.E. 1997. Status of the western grebe in British Columbia. Wildlife Working Report WR-87. B.C. Ministry of Environment, Lands, and Parks. Victoria, British Columbia. 40 pp.

Burger, J. 1998. Effects of motorboats and personal watercraft on flight behavior over a colony of common terns. Condor 100:528-534.

Campbell, K. 2003. Lake Lowell irrigation return drains water quality monitoring results April 2002 through October 2002. Idaho State Department of Agriculture. Boise, ID. 4 pp.

Canyon County. 2009. The impacts of irrigated agriculture and the economic base of Canyon County. Agricultural Economics Research Series No. 01-2010. Available at: http://canyoncountyfb.org/documents/The_Economy_of_Canyon_County_2009.pdf. Accessed November 2013.

Canyon County. 2011a. Canyon County 2020 comprehensive plan. Available at: http://www.canyonco.org/dsd.aspx?id=1116. Accessed June 11, 2012.

Canyon County. 2011b. Canyon County, Idaho zoning, revised December 21, 2011. Available at: http://www.canyonco.org/dsd.aspx?id=1116. Accessed May 16, 2011.

Canyon Highway District. 2009. Average daily traffic map. Available at: http://canyonhd4.org/userfiles/file/Average%20Daily%20Traffic%20Count%20Map.pdf. Accessed November 17, 2011.

Carver, E. and J. Caudill. 2007. Banking on nature 2006: the economic benefits to local communities of national wildlife refuge visitation. U.S. Fish and Wildlife Service, Division of Economics. Washington, D.C. 382 pp.

Casola, J.H., L. Cuo, B. Livneh, D.P. Lettenmaier, M.T. Stoelinga, P.W. Mote, and J.M. Wallace. 2009. Assessing the impacts of global warming on snowpack in the Washington cascades. Journal of Climate 22:2758-2772.

Castrovillo, P.J. 2010. Invertebrate survey of Deer Flat National Wildlife Refuge. Unpublished report. Deer Flat National Wildlife Refuge. 21 pp.

Cauchon, D. 2007. No end in sight for Idaho's growth. USA Today. September 28.

Causey, M.K. and C.A. Cude. 1980. Feral dog and white-tailed deer interactions in Alabama. Journal of Wildlife Management 44:481-484.

Chandler, J. 2003. Redband trout and bull trout associated with the Hells Canyon Complex. Hells Canyon FERC License Application. Idaho Power Company, Boise, ID. 168 pp.

Chawla, L. 1988. Children's concern for the natural environment. Children's Environments Quarterly 5(3):13-20.

Chen, D.D. 2000. The science of smart growth. Scientific American 283(6):84-91.

Church, J. 2003. 2003 county economic forecast: historic and forecast county population 2000-2003, Idaho economics. Available at: http://www.epa.gov/ttn/naaqs/ozone/areas/pop/popp_id.htm. Accessed October 23, 2012.

CIG (Climate Impacts Group, University of Washington). 2011. Climate variability. Available at: http://cses.washington.edu/cig/pnwc/clvariability.shtml. Accessed April 20, 2011.

City of Caldwell. 2010. City of Caldwell 2030 comprehensive plan. Available at: http://www.cityofcaldwell.com/file_depot/0-10000000/10000-20000/13986/folder/59467/Comprehensive+Plan+-+adopted+May+2010.pdf. Accessed July 8, 2011.

City of Nampa Department of Planning and Zoning. 2003. Employment. Available at: http://www.cityofnampa.us/revitalization/economy/employment.pdf. Accessed February 27, 2012.

City of Nampa. 2004. City of Nampa comprehensive plan. Available at: http://www.cityofnampa.us/downloads/21/Nampa%20Comp%20Plan%202004.pdf. Accessed May 13, 2011.

Cole, C.A., T.L. Serfass, M.C. Brittingham, and R.P. Brooks. 1996. Managing your restored wetland. Cooperative Extension Service. Pennsylvania State University, University Park.

Cole, D.N. 2004. Environmental impacts of outdoor recreation in wildlands. Pages 107-126 in: M.J. Manfredo, J.J. Vaske, B.L. Bruyere, D.R. Field, and P.J. Brown, eds. Society and natural resources: a summary of knowledge. Jefferson, MO: Modern Litho.

Cole, D.N. and J.L. Marion. 1988. Recreation impacts in some riparian forests of the eastern United States. Environmental Management 12:99-107.

Cole, D.N. and P.B. Landres. 1995. Indirect effects of recreation on wildlife. Pages 183-202 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Cole, D.N. and R.L. Knight. 1990. Impacts of recreation on biodiversity in wilderness. Natural Resources and Environmental Issues Vol. 0, Article 6. Available at: http://digitalcommons.usu.edu/nrei/vol0/iss1/6. Accessed May 18, 2012.

Coleman, J.S., S.A. Temple, and S.R. Craven. 1997. Facts on cats and wildlife: a conservation dilemma. Bulletin 7148. Cooperative Extension Publications, University of Maine. Available at: http://umaine.edu/publications/7148e/. Accessed May 18, 2012.

Colorado Division of Wildlife. 2008. Recommended buffer zones and seasonal restrictions for Colorado raptor nests. Colorado Division of Wildlife, Research Center. Fort Collins, CO. 7 pp.

COMPASS. 2010. Choice 2035. Available at: http://www.compassidaho.org/prodserv/demo-forecasts.htm. Accessed December 1, 2011.

Conservation Biology Institute. 2006. Protected areas database, compiled using Headwaters Economics Economic profile system-human dimensions toolkit. Available at: http://www.consbio.org/products. Accessed May 18, 2012.

Cordell, H.K. 2008. The latest trends in nature-based outdoor recreation. Forest History Today Spring 2008:4-10.

Corkran, C.C. and C. Thoms. 1996. Amphibians of Oregon, Washington, and British Columbia. Edmonton, Canada: Lone Pine Publishing.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service. Washington, D.C. Available at: http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm. Accessed May 18, 2012.

Cox, R.D. and V.J. Anderson. 2004. Increasing native diversity of cheatgrass-dominated rangeland through assisted succession. Journal of Rangeland Management 57:203-210.

Crooks, D.R. and M.E. Soule. 1999. Mesopredator release and avifaunal extinctions in a fragmented system. Nature 400:563-566.

Cunningham, R. 2012. Phone conversation regarding commercial carp removal operations on Lake Lowell between Rich Cunningham, Owner, Opaline Aqua Farms, Melba, ID, and Addison Mohler, Wildlife Biologist, Deer Flat NWR, June 21, 2012.

Cywinski, K. 2004. The effects of motorized watercraft on waterfowl. Summer Solstice 9(2).

Dahl, T.E. 1990. Wetlands losses in the United States 1780s to 1980s. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C. 13 pp.

Dahl, T.E. 2000. Status and trends of wetlands in the conterminous United States 1986 to 1997. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C. 82 pp.

Dale, D. and T. Weaver. 1974. Trampling effects on vegetation of the trail corridors of north Rocky Mountain forests. Journal of Applied Ecology 11:767-772.

Daszak, P., A. Strieby, A.A. Cunningham, J.E. Longcore, C.C. Brown, and D. Porter. 2004. Experimental evidence that the bullfrog (*Rana catesbeiana*) is a potential carrier of chytridiomycosis, an emerging fungal disease of amphibians. Herpetological Journal 14:201-207.

DeLong, A.K. 2002. Managing visitor use and disturbance of waterbirds—a literature review of impacts and mitigation measures. Prepared for Stillwater National Wildlife Refuge. Appendix L in: Stillwater National Wildlife Refuge Complex Final Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision (Volume II). Department of the Interior, Fish and Wildlife Service, Region 1, Portland, Oregon. 114 pp. Available at: http://www.fws.gov/pacific/planning/main/docs/NV/stillwater/4%20Volume%20II/Appendix%20L/App%20L%20final%20lit%20review.pdf. Accessed May 18, 2012.

DeLuca, T.H., W.A. Patterson, W.A. Freimund, and D.N. Cole. 1998. Influence of llamas, horses, and hikers on soil erosion from established recreation trails in western Montana. USA Environmental Management 22(2):255-262.

Dietsch, A. 2011. Personal communication between Alia Dietsch, Social Scientist (STEP), Policy Analysis & Science Assistance Branch, Fort Collins Science Center/U.S. Geological Survey, and Susan Kain, Visitor Services Program Manager, Deer Flat NWR, January 19, 2012, regarding analysis of subset of survey data.

Dixon, M.D. and W.C. Johnson. 1999. Riparian vegetation along the middle Snake River, Idaho: zonation, geographical trends, and historical changes. Great Basin Naturalist 59(1):18-34.

Dobkin, D.S. 1994. Conservation and management of neotropical migrant landbirds in the northern Rockies and Great Plains. Moscow, ID: University of Idaho Press.

Dobkin, D.S. and J.D. Sauder. 2004. Shrubsteppe landscapes in jeopardy. Distributions, abundances, and the uncertain future of birds and small mammals in the intermountain West. High Desert Ecological Research Institute. Bend, OR. 47 pp.

Dunn, S. 2012. Personal communication between Steven Dunn, Natural Resource Specialist, Bureau of Reclamation, and Jennifer Brown-Scott, Refuge Manager, Deer Flat NWR, February 14, 2012, regarding date of closure and first storage at Lake Lowell.

Ecovista and IDFG (Idaho Department of Fish and Game). 2004. Middle Snake subbasins assessment. Northwest Power and Conservation Council. Portland, OR. 58 pp.

EPA (Environmental Protection Agency). 2011. New Zealand mudsnail. Region 10 Pacific Northwest. Available at: http://yosemite.epa.gov/r10/ECOCOMM.NSF/B724CA698F6054798825705700693650/7BCDBF15A89BDC13882574160054BCE8?OpenDocument. Accessed May 18, 2012.

Farmer, Adrian H. and Alfred H. Parent. 1997. Effects of the landscape on shorebird movements at spring migration stopovers. Condor 99(3):698-707.

FAA (Federal Aviation Administration). 2012. Wildlife strike database. Available at: http://wildlife-mitigation.tc.faa.gov/wildlife/default.aspx. Accessed May 18, 2012.

Federal Register. 1998. Endangered and threatened wildlife and plants; proposed threatened status for the plant *Thelypodium howellii* ssp. *spectabilis* (Howell's spectacular thelypody). Federal Register 63:1948-1954.

Federal Register. 2009. Endangered and threatened wildlife and plants: listing *Lepidium papilliferum* (slickspot peppergrass) as threatened species throughout its range. Federal Register 74:52014-52064. Available at: http://www.gpo.gov/fdsys/pkg/FR-2009-10-08/pdf/E9-24039.pdf. Accessed April 27, 2013.

Federal Register. 2011. Endangered and threatened wildlife and plants; designation of critical habitat for *Lepidium papilliferum* (slickspot peppergrass). Federal Register 76:27184-27215.

Fernández, G., N. Warnock, D.B. Lank, and J.B. Buchanan. 2010. Conservation plan for the western sandpiper (*Calidris mauri*), version 1.1, February 2010. Western Hemisphere Shorebird Reserve Network and Manomet Center for Conservation Sciences. Manomet, MA. 48 pp.

Fernández-Juricic, E., P.A. Zollner, C. LeBlanc, and L.M. Westphal. 2007. Responses of nestling black-crowned night herons (*Nycticorax nycticorax*) to aquatic and terrestrial recreational activities: a manipulative study. Waterbirds 30(4):554-565.

Ferrari, R. 1995. Lake Lowell 1994 reservoir survey. Bureau of Reclamation, Sedimentation and River Hydraulics Group, Water Resources Services, Technical Service Center. Denver, CO. 13 pp.

Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology 8(3):629-644.

Fletcher, K. 2011. Proposed Idaho environmental literacy plan. Available at: http://www.idahoee.org/PDFs/Proposed_%20Idaho_ELP.pdf. Accessed May 18, 2012.

Gabrielsen, G.W. and E.N. Smith. 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Geist, V. 1978. Behavior. Pages 283-296 in: J.L. Schmidt and D.L. Gilbert, eds. Big game of North America: ecology and management. Harrisburg, PA: Stackpole Books.

GeoEngineers. 2006. Focused site inspection report U.S. Fish and Wildlife Deer Flat National Wildlife Refuge abandoned Canyon County landfill Nampa, Idaho. GeoEngineers. Boise, ID. 20 pp.

Goodwin, A. 2003. Sprawl threatens quality of life, study says. Available at: http://www.spokesmanreview.com/news-story.asp?date=070703&ID=s1378246. Accessed January 25, 2012.

Green, T.J. 1982. House form and variability at Givens Hot Springs, southwest Idaho. Idaho Archaeologist 6:33-43.

Green, R.E., S.J. Cornell, J.P.W. Scharlemann, and A. Balmford. 2005. Farming and the fate of wild nature. Science 307(5709):550-555.

Greenwalt, L.A. 1978. The National Wildlife Refuge System. Pages 399-412 in: H.P. Brokaw, ed. Wildlife and America. Washington, D.C.: Council on Environmental Quality.

Groves, C.R., B. Butterfield, A. Lippincott, B. Csuti, and J.M. Scott. 1997. Atlas of Idaho's wildlife. Nongame and Endangered Wildlife Program, Idaho Department of Fish and Game, Boise. 411 pp.

Gutzwiller, K.J. and H.A. Marcum. 1993. Avian responses to observer clothing color: caveats from winter point counts. Wilson Bulletin 105:628-636.

Hamann, B., H. Johnston, P. McClelland, S. Johnson, L. Kelly, and J. Gobielle. 1999. Birds. Pages 3.1-3.34 in: G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society. 307 pp.

Hamlet, A.F. and D.P. Lettenmaier. 2007. Effects of 20th century warming and climate variability on flood risk in the western U.S. Water Resources Research, Vol. 43, W06427 (doi:10.1029/2006WR005099).

Hansen, M.J. and A.P. Clevenger. 2005. The influence of disturbance and habitat on the presence of non-native plant species along transport corridors. Biological Conservation 125(2005):249-259.

Hanus, S., H. Wollis, and L. Wilkinson. 2002. Western (*Aechmophorus occidentalis*) and eared (*Podiceps nigricollis*) grebes of central Alberta: inventory, survey techniques and management concerns. Species at Risk Report No. 41. Alberta Sustainable Resource Development, Fish and Wildlife Division. Edmonton, Canada. 52 pp.

Havera, S.P., L.R. Boens, M.M. Georgi, and R.T. Shealy. 1992. Human disturbance of waterfowl on Keokuk Pool, Mississippi River. Wildlife Society Bulletin 20(3):290-298.

Hayes, G.F. and K.D. Holl. 2003. Cattle grazing impacts on annual forbs and vegetation composition of mesic grasslands in California. Conservation Biology 17(6):1694-1702.

Headwaters Economics. 2008. Economic profile system-human dimensions toolkit (EPS–HDT). Available at: http://headwaterseconomics.org/tools/eps-hdt. Accessed September 5, 2011.

Heberlein, T.A. 1991. Changing attitudes and funding for wildlife: preserving the sport hunter. Wildlife Society Bulletin 19(4):528-534.

Hoshovsky, M.C. and J.M. Randall. 2000. Management of invasive species. In: C.C. Bossard, J.M. Randall, and M.C. Hoshovsky, eds. Invasive plants of California's wildland. Berkeley, CA: University of California Press. Available at: http://www.cal-ipc.org/ip/management/ipcw/mois.php. Accessed May 30, 2012.

Howe, M.A. 1987. Wetlands and waterbird conservation. American Birds 41:204-209.

Hudson, M.S. 1983. Waterfowl production of three age-classes of stock ponds in Montana. Journal of Wildlife Management 47:112-117.

Huffman, K. 1999. San Diego South Bay survey report - effects of human activity and water craft on wintering birds in South San Diego Bay. USFWS. 45 pp.

Hull, A.C., Jr. and J.F. Pechanec. 1947. Cheat grass-a challenge to range research. Journal of Forestry 45:555-564.

Idaho Department of Labor. 2009. Idaho economic update. Available at: http://labor.idaho.gov/publications/EconUpdate_Sept_2009.pdf. Accessed January 25, 2012.

Idaho Department of Labor. 2011a. Canyon County: work force trends. Idaho Department of Labor. Boise, ID. 2 pp.

Idaho Department of Labor. 2011b. Ada County: work force trends. Idaho Department of Labor. Boise, ID. 2 pp.

Idaho Department of Labor. 2011c. Idaho's job recovery to remain slow in 2011. Idaho Department of Labor. Boise, ID. 4 pp.

Idaho Division of Financial Management. 2004. Idaho economic forecast. Idaho Division of Financial Management. Boise, ID. 73 pp.

Idaho Partners in Flight. 1998. Riparian riches: habitat management for birds in Idaho. Available at: http://www.pwrc.usgs.gov/pif/pubs/riparian_riches_pif_98_view2.pdf. Accessed May 18, 2012.

Idaho Partners in Flight. 2000. Idaho bird conservation plan version 1.0. Available at: http://fishandgame.idaho.gov/public/wildlife/nongame/brochureBirdConservePlan.pdf. Accessed May 18, 2012. 166 pp.

Idaho Power Company. 2003. Feasibility of reintroduction of anadromous fish above or within the Hells Canyon Complex. Technical report appendix E.3.1-2. Idaho Power Company. Boise, ID. 54 pp.

Idaho Soil and Water Conservation Commission. 2012. Lake Lowell watershed (17050114SW004_06) total maximum daily load implementation plan for agriculture. Soil and Water Conservation Commission, Boise, ID. 34 pp.

IDEQ (Idaho Department of Environmental Quality). 2001. Strategy for the development of an airshed management program for the Treasure Valley. Available at: http://www.deq.state.id.us/media/352830-airshed_management_entire.pdf. Accessed July 18, 2011.

IDEQ. 2007. Historical AQI data – Canyon County. Available at: http://www.deq.idaho.gov/Applications/AQReportFrame/histCanyon.pdf. Accessed October 28, 2011.

IDEQ. 2010. Lake Lowell TMDL: addendum to the lower Boise River subbasin assessment and total maximum daily loads. IDEQ Boise Regional Office. Boise, ID. 247 pp. Available at: http://www.deq.idaho.gov/media/451719-_water_data_reports_surface_water_tmdls_boise_river_lower_lake_lowell_addendum.pdf. Accessed June 11, 2012.

IDEQ. 2011a. Air quality in the Boise region. Available at: http://www.deq.idaho.gov/air/data_reports/monitoring/bro.cfm. Accessed April 20, 2011.

IDEQ. 2011b. Surface water: water quality improvement plans (TMDLs). Available at: http://www.deq.idaho.gov/water/data_reports/surface_water/tmdls/overview.cfm#TMDL. Accessed May 20, 2011.

IDEQ. 2011c. Surface water: Water Quality Criteria. Available at: http://www.deq.idaho.gov/water-quality/surface-water/water-quality-criteria.aspx. Accessed July 20, 2012.

IDEQ. 2011d. Idaho Department of Environmental Quality Final 2010 Integrated Report. Idaho Department of Environmental Quality. Boise, ID. 776 pp.

IDEQ and ODEQ (Oregon Department of Environmental Quality). 2004. Snake River–Hells Canyon total maximum daily load (TMDL). Boise, ID, and Pendleton, OR. 633 pp. + appendices.

IDFG (Idaho Department of Fish and Game). 1965. Federal aid to fish restoration annual completion report: Water Quality Investigation Report F 34-R-8. Idaho Department of Fish and Game. Boise, ID. 28 pp.

IDFG. 2005. Idaho comprehensive wildlife conservation strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. Available at: http://fishandgame.idaho.gov/public/wildlife/cwcs/. Accessed May 18, 2012.

IDFG. 2007. Idaho fisheries management plan 2007-2012. Idaho Conservation Data Center, Idaho Department of Fish and Game. Boise, ID. 410 pp.

IDFG. 2009a. Waterfowl fall and winter surveys, production, summer banding, and harvest. Project W-170-R-33. Idaho Department of Fish and Game. Boise, ID. 56 pp. Available at: https://research.idfg.idaho.gov/wildlife/Wildlife%20Technical%20Reports/Waterfowl%20Statewide%20PR09.pdf. Accessed May 18, 2012.

IDFG. 2009b. Fishery management annual report, southwest region. IDFG 09-130. Idaho Department of Fish and Game. Boise, ID. 142 pp.

IDFG. 2010a. Fishery management annual report, southwest region. IDFG 11-110. Idaho Department of Fish and Game. Boise, ID. 136 pp. Available at: https://research.idfg.idaho.gov/Fisheries%20Research%20Reports/mgt11-110Kozfkay2010%20Fisheries%20Management%20Annual%20Report%202010%20Southwest%20Region.pdf. Accessed May 2, 2012.

IDFG. 2010b. Project W-170-R-34: Annual Report, Mule Deer Study I, Job 2, July 2, 2009 to June 30, 2010. Idaho Department of Fish and Game. Boise, ID. 97 pp.

IDPR (Idaho Department of Parks and Recreation). 2003. Idaho SCORTP 2003–2007: statewide comprehensive outdoor recreation plan. Idaho Department of Parks and Recreation. Boise, ID. 328 pp.

IDPR. 2006. Recreation next: 2006-2010 Idaho statewide comprehensive outdoor recreation plan. Idaho Department of Parks and Recreation. Boise, ID. 396 pp.

IDPR. 2010. Boat registration data 2005-2009. http://parksandrecreation.idaho.gov/datacenter/recreation_statistics.aspx. Accessed November 29, 2011.

IDWR (Idaho Department of Water Resources). 2011. Irrigation rights finder. Available at: http://maps.idwr.idaho.gov/IrrigationRightsFinder/Map. Accessed July 6, 2011.

IPCC (Intergovernmental Panel on Climate Change). 2007. Climate change 2007: the physical science basis. In: S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller, eds. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, and New York, NY: Cambridge University Press. Available at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4_wg1_full_report.pdf

ISHS (Idaho State Historical Society). 1970. Fur trade posts in Idaho. ISHS Reference Series Number 62. Idaho State Historical Society. Boise, ID. 3 pp.

ISHS. 1982. Fort Boise (Riverside) ferry. ISHS Reference Series Number 756. Idaho State Historical Society. Boise, ID. 5 pp.

ISHS. n.d. ISHS Reference Series Number 29. Location of Fort Boise, 1834-1855. Available at: http://history.idaho.gov/sites/default/files/uploads/reference-series/0029.pdf.

Ivey, G.L. 2004. Conservation assessment and management plan for breeding western and Clark's grebes in California. Prepared for American Trader Trustee Council: an interagency group comprised of representatives from the California Department of Fish and Game, National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service. Corvallis, Oregon.

Ivey, G.L. and C.P. Herziger. 2006. Intermountain West waterbird conservation plan, version 1.2: a plan associated with the Waterbird Conservation for the Americas Initiative. U.S. Fish and Wildlife Service Pacific Region. Portland, OR. 208 pp.

IWJV (Intermountain West Joint Venture) Idaho Steering Committee. 2005. Coordinated implementation plan for bird conservation in Idaho. Available at: http://saltshake.com.s50844.gridserver.com/?get=1.28.148. Accessed May 18, 2012.

Jackson, Z., J.M.C. Quist, J.A. Downing, and J.G.G. Larscheid. 2010. Common carp (*Cyprinus carpio*), sport fishes, and water quality: ecological thresholds in agriculturally eutropic lakes. Lake and Reservoir Management 26:14-22.

Jahn, L.R. and J.B. Trefethen. 1978. Funding wildlife conservation programs. Pages 456-470 in: H.P. Brokaw, ed. Wildlife and America: contributions to an understanding of American wildlife and its conservation. Washington, D.C.: Council on Environmental Quality.

Jankovsky-Jones, M. 2001. Wetland conservation strategy for the middle and western Snake River and lower reaches of its major tributaries including the Boise River and Payette River. Idaho Conservation Data Center. IDFG National Resource Policy Bureau. Boise, ID. 175 pp.

Johnson, S. 1994. Recreational boating impact investigations—Upper Mississippi River system, pool 4, Red Wing, Minnesota. EMTC 94-S004. Prepared for the National Biological Survey, Environmental Management Technical Center. Minnesota Department of Natural Resources. Lake City, MN. 48 pp. + appendices.

Kahl, R. 1991. Boating disturbance of canvasbacks during migration at Lake Poygan, Wisconsin. Wildlife Society Bulletin 19(3):242-248.

Kaiser, M. and E. Fritzell. 1984. Effects of river recreationists on green-backed heron behavior. Journal of Wildlife Management 48(2):561-567.

Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications … a review. Journal of Range Management 37(5):430-438.

Kenow, K.P., C.E. Korschgen, J.M. Nissen, A. Elfessi, and R. Steinbach. 2003. A voluntary program to curtail boat disturbance to waterfowl during migration. Waterbirds 26(1):77-87.

Kight, C.R. and J.P. Swaddle. 2007. Associations of anthropogenic activity and disturbance with fitness metrics of eastern bluebirds (*Sialia sialis*). Biological Conservation 138(1-2):189-197.

Klein, M.L. 1993. Waterbird behavioral responses to human disturbances. Wildlife Society Bulletin 21(1):31-39.

Knapton, R.W., S.A. Petrie, and G. Herring. 2000. Human disturbance of diving ducks on Long Point Bay, Lake Erie. Wildlife Society Bulletin 28(4):923-930.

Knick, S.T. and J.T. Rotenberry. 2002. Effects of habitat fragmentation on passerine birds breeding in Intermountain shrubsteppe. Studies in Avian Biology 25:131-141.

Knick, S.T., D.S. Dobkin, J.T. Rotenberry, M.A. Schroeder, W.M. Vander Haegen, and C. Van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. Condor 105:611-634.

Knight, R.L. and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Knight, R.L. and D.N. Cole. 1995a. Factors that influence wildlife responses to recreationists. Pages 71-79 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and D.N. Cole. 1995b. Wildlife responses to recreationists. Pages 51-69 in: R.L. Knight and K.J. Gutzwiller, eds. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L., G.N. Wallace, and W.E. Riebsame. 1995. Ranching the view, subdivisions versus agriculture. Conservation Biology 9:459-461.

Knight, R.L. and K.J. Gutzwiller, eds. 1995. Wildlife and recreationists: coexistence through management and research. Washington, D.C.: Island Press.

Knight, R.L. and S.G. Miller. 1996. Wildlife responses to pedestrians and dogs. Final report submitted to City of Boulder Open Space Department. Department of Fishery and Wildlife Biology, Colorado State University. Fort Collins, CO. 24 pp.

Knight, R.L., D.P. Anderson, and N.V. Marr. 1991. Responses of an avian scavenging guild to anglers. Biological Conservation 56:195-205.

Knopf, F.L. 1994. Avian assemblages on altered grasslands. Studies in Avian Biology 15:247-257.

Knopf, F.L., R.R. Johnson, T. Rich, F.B. Samson, and R.C. Szaro. 1988. Conservation of riparian ecosystems in the United States. Wilson Bulletin 100(2):272-284.

Knowles, N., M.D. Dettinger, and D.R. Cayan. 2006. Trends in snowfall versus rainfall in the western United States. Journal of Climate 19(18):4545-4559.

Kochert, M.N. and M. Pellant. 1986. Multiple use in the Snake River Birds of Prey Area. Rangelands 8(5):217-220.

Korschgen, C., L. George, and W. Green. 1985. Disturbance of diving ducks by boaters on a migrational staging area. Wildlife Society Bulletin 13:290-296.

Korschgen, C.E. and R.B. Dahlgren. 1992. Human disturbances of waterfowl: causes, effects, and management. Waterfowl Management Handbook. Fish and Wildlife Leaflet 13.2.15. U.S. Fish and Wildlife Service. 8 pp.

Kozfkay, J. 2011. Idaho Department of Fish and Game news release: dealing with Lake Lowell's carp. August 8, 2011. Available at: http://fishandgame.idaho.gov/public/media/viewNewsRelease.cfm?newsID=5957. Accessed May 18, 2012.

Kozfkay, J. 2012. Personal communication between Joe Kozfkay, Regional Fisheries Manager, Idaho Department of Fish and Game and Jennifer Brown-Scott, Refuge Manager, Deer Flat NWR, April 4, 2012, regarding comments on Deer Flat Internal Review Draft CCP.

Krammerer, J.C. 1990. Water fact sheet: largest rivers in the United States. Open file report 87-242. U.S. Geological Survey. Reston, VA. 2 pp.

Kushlan, J.A., M. Steinkamp, K. Parsons, J. Capp, M.A. Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R.M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J.E. Saliva, B. Syderman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird conservation for the Americas: the North American waterbird conservation plan, version 1. Waterbird Conservation for the Americas. Washington, D.C. 84 pp.

Lake Ripley Management District. 2003. Lake Ripley watercraft census and recreational carrying capacity analysis. Available at: http://lakeripley1.homestead.com/files/Lake_Ripley_Carrying_Capacity_Report.pdf. Accessed May 18, 2012.

Lawrence, G.E. 1950. The diving and feeding activity of the western grebe on the breeding grounds. Condor 52:3-16.

Liddle, M.J. 1975. A selective review of the ecological effects of human trampling on natural ecosystems. Biological Conservation 7:17-36.

Liebman, M. and E. Dyck. 1993. Crop rotation and intercropping strategies for weed management. Ecological Applications 3(1):92-122.

Louv, R. 2005. Last child in the woods: saving our children from nature-deficit disorder. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Lovell, B.B. 1980. Soil survey of Malheur County, Oregon–northeastern part. U.S. Department of Agriculture, Natural Resources Conservation Service. Washington, D.C. 53 pp.

Lowry, D.A. and K.L. McArthur. 1978. Domestic dogs as predators on deer. Wildlife Society Bulletin 6:38-39.

Mac, M.J., P.A. Opler, C.E. Puckett Haecker, and P.D. Doran. 1998. Status and trends of the nation's biological resources. Vols. 1 and 2. U.S. Geological Survey. Reston, VA. 911 pp. Available at: http://www.nwrc.usgs.gov/sandt/SNT.pdf. Accessed May 31, 2013.

Madsen, J. 1995. Impacts of disturbance on migratory waterfowl. Ibis 137:S67-S74.

Malde, H.E. 1991. Quaternary geology and structural history of the Snake River Plain, Idaho and Oregon. Pages 251-281 in: R.B. Morrison, ed. Quaternary nonglacial geology: conterminous United States. Boulder, CO: Geological Society of America.

Mancuso, M. 1999. The status of *Astragalus cusickii* var. *packardiae* (Packard's milkvetch). Idaho Department of Fish and Game, Idaho Conservation Data Center. Boise, ID. 26 pp.

Manning, A. and L. Hartley. 2006. Important sites for aquatic birds in Idaho. Version 2.0. Coordinated bird monitoring (CBM) effort. Available at: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CF0QFjAA&url=http%3A%2F%2Fgreatbasin.wr.usgs.gov%2FCBM%2FContent%2FPublications%2FIDAHO_Important%2520sites%2520for%2520aquatic%2520birds_ver2.doc&ei=ypq2T_-RBobX6gGhn73DCg&usg=AFQjCNGyGlzb1wMx1nFtirUGMxn8EsuPRg&sig2=iOPXHQUsbAK1KLvW4AfCBQ. Accessed May 18, 2012.

McLandress, M.R. and D.R. Raveling. 1981. Changes in diet and body composition of Canada geese before spring migration. Auk 98:65-79.

Meador, M.R. and R.M. Goldstein. 2003. Assessing water quality at large geographic scales: relations among land use, water physicochemistry, riparian condition, and fish community structure. Environmental Management 31(4):0504-0517.

Menne, M.J., C.N. Williams, Jr., and R.S. Vose. 2011. United States Historical Climatology Network (USHCN) version 2 serial monthly dataset. Carbon Dioxide Information Analysis Center. Oak Ridge National Laboratory. Oak Ridge, TN. Available at: http://www.ncdc.noaa.gov/oa/climate/research/ushcn/. Accessed May 18, 2012.

Miller, J.R. and N.T. Hobbs. 2000. Recreational trails, human activity, and nest predation in lowland riparian areas. Landscape and Urban Planning 50(4):227-236.

Miller, R.F. and L. Eddleman. 2001. Spatial and temporal changes of sage grouse habitat in the sagebrush biome. Technical Bulletin 151. Agricultural Experiment Station, Oregon State University. Corvallis, OR. 39 pp.

Miller, S.A. and T.A. Crowl. 2006. Effects of common carp on macrophytes and invertebrate communities in a shallow lake. Freshwater Biology 51:85-94.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8(1):162-169.

Morton, J.M., A.C. Fowler, and R.L. Kirkpatrick. 1989. Time and energy budgets of American black ducks in winter. Journal of Wildlife Management 53:401-410.

Mote, P.W. and E.P. Salathé. 2009. Future climate in the Pacific Northwest. Chapter 1 in: J. Littell, M.M. Elsner, L.W. Binder, and A. Snover, eds. Washington climate change impacts assessment. Climate Impacts Group, University of Washington. Seattle, WA. 24 pp.

Mote, P.W. and E.P. Salathé. 2010. Future climate in the Pacific Northwest. Climatic Change 102(1-2):29-50 (doi: 10.1007/s10584-010-9848-z).

Mote, P.W., A.F. Hamlet, M.P. Clark, and D.P. Lettenmaier. 2005. Declining mountain snowpack in western North America. Bulletin of the American Meteorological Society 86(1):39-49.

Moulton, C. 2010. Personal communication between Colleen Moulton, Avian Ecologist, Idaho Department of Fish and Game, and Kendra Niemec, Assistant Refuge Manager, Deer Flat NWR, December 6, 2010, e-mail regarding colonial waterbirds.

NASA (National Aeronautics and Space Administration). 2006. MODIS land cover type, compiled using Headwaters Economics profile system-human dimensions toolkit. Available at: http://modis-land.gsfc.nasa.gov/. Accessed May 18, 2012.

National Academy of Sciences. 2008. Understanding and responding to climate change: highlights of national academies reports. 2008 ed. Board on Atmospheric Sciences and Climate, National Academy of Sciences. Washington, D.C. 28 pp.

NAWMPC (North American Waterfowl Management Plan Committee). 2004. North American waterfowl management plan. Implementation framework: strengthening the biological foundation. Canadian Wildlife Service, U.S. Fish and Wildlife Service, Secretaria de Medio Ambiente y Recursos Naturales. 106 pp.

NCDC (National Climate Data Center). 2010 state of the climate, annual 2010. Available at: http://www.ncdc.noaa.gov/sotc/2010/13. Accessed October 25, 2011.

Nelson, T.A. and A. Woolf. 1987. Mortality of white-tailed deer fawns in southern Illinois. Journal of Wildlife Management 51(2):326-329.

Nissan Marine. 2012. Nissan outboard fuel consumption. Available at: http://www.nissanmarine.com/tech_talk/gas_mileage.html. Accessed March 1, 2012.

Northwest Habitat Institute. 2011. Interactive biodiversity information system. Available at: http://www.nwhi.org/index/ibis. Accessed May 18, 2012.

Novitzki, R.P, R.D. Smith, and J.D. Fretwell. 1999. Restoration, creation, and recovery of wetlands: wetland functions, values, and assessment. In: National water summary on wetland resources. U.S. Geological Survey Water-Supply Paper 2425. Available at: http://water.usgs.gov/nwsum/WSP2425/index.html. Accessed May 18, 2012.

O'Connor, J.E. 1993. Hydrology, hydraulics, and geomorphology: Bonneville Flood. Special Paper 274. Geological Society of America. Boulder, CO. 83 pp.

O'Connor, J.E. and J.E. Costa. 2004. The world's largest floods, past and present—their causes and magnitudes. Circular 1254. U.S. Geological Survey. Reston, VA. 13 pp.

Oberbillig, D.R. 2000. Providing positive wildlife viewing experiences. Deborah Richie Communications. Missoula, MT.

ODFW (Oregon Department of Fish and Wildlife). 2010. New Zealand mudsnails: how to prevent the spread of New Zealand mud snails through field gear. Available at: http://www.dfw.state.or.us/conservationstrategy/invasive_species/docs/NZ_Mudsnails_10-page.pdf. Accessed May 18, 2012.

ODFW. 2011. Oriental weatherfish fact sheet. Available at: http://www.dfw.state.or.us/conservationstrategy/invasive_species/oriental_weatherfish.asp. Accessed November 8, 2011.

Olson, D. and S. Lindall. 1999. IMPLAN professional software, analysis, and data guide. Stillwater, MN: Minnesota IMPLAN Group, Inc.

ORBIC (Oregon Biodiversity Information Center). 2010. Oregon threatened and endangered plant field guide: *Thelypodium howellii* ssp. *spectabilis*. Available at: http://orbic.pdx.edu/plants/view_plants2.php. Accessed June 20, 2012.

Oring, L.W., L. Neel, and K.E. Oring. 2000. U.S. shorebird conservation plan. Intermountain West regional shorebird plan version 1.0. Available at: shorebirdplan.fws.gov/RegionalShorebird/downloads/IMWEST4.doc. Accessed May 18, 2012.

Orr, E.L. and W.N. Orr. 1996. Geology of the Pacific Northwest. New York: McGraw Hill Publishing Company.

Owens, N.W. 1977. Responses of wintering brant geese to human disturbance. Wildfowl 28:5-14. Available at: http://www.wwt.org.uk/what-we-do/publications/wildfowl/archive/. Accessed July 24, 2012.

Owyhee County. 2002. Owyhee County comprehensive plan. Available at: http://owyheecounty.net/docs/adminforms/Owyhee%20County%20Comp%20Plan080910.pdf. Accessed May 16, 2011.

Palmberg, I.E. and J. Kuru. 2000. Outdoor activities as a basis for environmental responsibility. Journal of Environmental Education 31:4, 32-36.

Patterson, M.P. and L.B. Best. 1996. Bird abundance and nesting success in Iowa CRP fields: the importance of vegetation structure and composition. American Midland Naturalist 135(1):153-167.

Payette County. 2006. Payette County comprehensive plan. Payette County, ID. 118 pp.

Pease, M.L., R.K. Rose, and M.J. Butler. 2005. Effects of human disturbances on the behavior of wintering ducks. Wildlife Society Bulletin 33(1):103-112.

Peck, G.K. and R.D. James. 1983. Breeding birds of Ontario: nidiology and distribution, vol. 1. Non-passerines. Life Science Publishing, Royal Ontario Musuem. Toronto, ON. 38 pp.

Pellant, M., B. Abbey, and S. Karl. 2004. Restoring the Great Basin desert, U.S.A.: integrating science, management, and people. Environmental Monitoring and Assessment 99:169-179.

Plew, M.G. 2000. The archaeology of the Snake River plain. Boise, ID: Boise State University.

Ponzetti, J.M. 1997. Assessment of medusahead and cheatgrass control techniques at Lawrence Memorial Grassland Preserve 1996 annual report. January 14, 1997. The Nature Conservancy of Oregon. 17 pp.

Priest, T.W., C.W. Case, J.E. Witty, R.K. Preece, Jr., G.A. Monroe, H.W. Biggerstaff, G.H. Logan, L.M. Rasmussen, and D.H. Webb. 1972. Soil survey of Canyon area, Idaho. U.S. Department of Agriculture, Natural Resources Conservation Service. Washington, D.C. 84 pp.

Quigley, T.M., R.W. Haynes, and R.T. Graham, eds. 1996. Integrated scientific assessment for ecosystem management in the interior Columbia Basin and portions of the Klamath and Great Basins. General Technical Report PNW-GTR-382. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, OR. 303 pp.

Rasmussen, L.M. 1976. Soil survey of Payette County, Idaho. U.S. Department of Agriculture, Soil Conservation Service. Washington, D.C. 74 pp.

Raveling, D.G. 1979. The annual energy cycle of the cackling Canada goose. Pages 81-93 in: R.L. Jarvis and J.C. Bartonek, eds. Management and biology of Pacific Flyway geese. Corvallis, Oregon: OSU Book Stores.

Reclamation (Bureau of Reclamation). 1977. Water quality study, Boise Valley. Volume 1 (excerpts from Volume 2 [raw data]). January 1977. R-2. U.S. Bureau of Reclamation. Boise, ID.

Reclamation. 1980. Algae blooms and phosphorus loading in Lake Lowell, Boise Project, Idaho. July 1980. Water and Power Resources Service, Pacific Northwest Region. Boise, ID. 31 pp.

Reclamation. 2011. Project details: Boise Project. Available at: http://www.usbr.gov/projects/Project.jsp?proj_Name=Boise%20Project&pageType=ProjectDataPage#Group22155. Accessed April 19, 2011.

Reclamation. n.d. Lake Lowell, ID. Available at: http://www.recreation.gov/recAreaDetails.do?contractCode=NRSO&recAreaId=112&agencyCode=129. Accessed January 24, 2012.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Iñigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, and T.C. Will. 2004. Partners in Flight North American landbird conservation plan. Cornell Lab of Ornithology. Ithaca, NY. 110 pp.

Rich, T.D., M.J. Wisdom, and V.A. Saab. 2005. Conservation of priority birds in sagebrush ecosystems. General Technical Report PSW-GTR-191. U.S. Department of Agriculture, Forest Service. 18 pp.

Rodgers, J.A., Jr. and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25(1):139-145.

Rodgers, J.A., Jr. and S.T. Schwikert. 2002. Buffer-zone distances to protect foraging and loafing waterbirds from disturbance by personal watercraft and outboard-powered boats. Conservation Biology 16(1):216-224.

Saab, V.A. and T.D. Rich. 1997. Large-scale conservation assessment for neotropical migratory land bird in the Interior Columbia River Basin. General Technical Report PNW-GTR-399. U.S. Department of Agriculture, Forest Service. 63 pp.

Safina, C. and J. Burger. 1983. Effects of human disturbance on reproductive success in the black skimmer. Condor 85:164-171.

Salathé, E.P., L.R. Leung, Y. Qian, and Y. Zhang. 2010. Regional climate model projections for the state of Washington. Climatic Change 102(1-2):51-75 (doi: 10.1007/s10584-010-9849-y).

Severson, K.E. and C.E. Boldt. 1978. Cattle, wildlife, and riparian habitats in the western Dakotas. Pages 94-103 in: Management and use of northern plains rangeland. Regional Rangeland Symposium. North Dakota State University. Bismarck, ND.

Sexton, N.R., A.M. Dietsch, A.W. Don Carlos, L. Koontz, A.N. Solomon, and H.M. Miller. 2012. National wildlife refuge visitor survey 2010/2011: individual refuge results (Deer Flat). Data Series 643. U.S. Geological Survey. Reston, VA. 69 pp.

Shaw, D.W.H. 1998. Changes in population size and colony location of breeding waterbirds at Eagle Lake, California between 1970 and 1997. Thesis. California State University, Chico.

Sime, C.A. 1999. Domestic dogs in wildlife habitats. Pages 8.1-8.17 in: G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society. 307 pp.

Simonds, W.J. 1997. The Boise Project. Bureau of Reclamation History Program. Denver, CO. 58 pp.

Skagen, S.K., R.L. Knight, and G.H. Orians. 1991. Human disturbances of an avian scavenging guild. Ecological Applications 1:215-225.

Smith, J.P., C.J. Farmer, S.W. Hoffman, G.S. Kaltenecker, K.Z. Woodruff, and P.F. Sherrington. 2008. Trends in autumn counts of migratory raptors in western North America. Pages 217-252 in: K.L. Bildstein, J.P. Smith, E. Ruelas I., and R.R. Veit, eds. State of North America's birds of prey. Series in Ornithology No. 3. Nuttall Ornithological Club and American Ornithologists' Union. Cambridge, MA, and Washington, D.C. 466 pp.

Smithers, A. 2006. Deer Flat abnormal amphibian report. Unpublished report. Deer Flat National Wildlife Refuge, ID. 5 pp.

Snake River Canyon Scenic Byway. 2009. Corridor Management Plan

Sorensen, P.W. 2006. Developing pheromones for use in carp control. Project report. 11 pp. Available at: http://archive.leg.state.mn.us/docs/2007/mandated/070063.pdf. Accessed January 3, 2013.

Sorensen, P.W. and T.R. Hoye. 2007. A critical review of the discovery and application of a migratory pheromone in an invasive fish, the sea lamprey Petromyzon marinus. Journal of Fish Biology 71:100-114.

Sorensen, P.W. and N.E. Stacey. 2004. Brief review of fish pheromones and discussion of their possible uses in the control of non-indigenous teleost fishes. New Zealand Journal of Marine and Freshwater Research 38:399-417.

Sorensen, P.W. and L.A. Vrieze. 2003. The chemical ecology and potential application of the sea lamprey migratory pheromone. Journal of Great Lakes Research 29 (Supplement 1):66-84. 26 pp.

Speir, C. and K. Stephenson. 2002. Does sprawl cost us all?: isolating the effects of housing patterns on public water and sewer costs. Journal of the American Planning Association 68(1):56-70.

SPPCG (Subcommittee on Pacific Population of Canada Geese). 2000. Pacific Flyway management plan for the Pacific Population of Canada Geese (unpublished report). Pacific Flyway Study Committee, U.S. Fish and Wildlife Service. Portland, OR. 31 pp.

Stalmaster, M.V. and J.L. Kaiser. 1997. Flushing responses of wintering bald eagles to military activity. Journal of Wildlife Management 61(4):1307-1313.

Steel, P.E., P.D. Dalke, and E.G. Bizeau. 1957. Canada Goose production at Gray's Lake, Idaho, 1949-1951. Journal of Wildlife Management 21(1):38-41.

Stevens, L.E., B. Brown, J.M. Simpson, and R.R. Johnson. 1977. The importance of riparian habitat to migrating birds. Pages 156-164 in: R.R. Johnson and D.A. Jones, technical coordinators. Importance, preservation and management of riparian habitat: a symposium. General Technical Report RM-43. U.S. Department of Agriculture, Forest Service. 217 pp.

Steward, J. 1938. Basin-Plateau aboriginal sociopolitical groups. Bulletin No. 120. Bureau of American Ethnology. Washington, D.C. 346 pp.

Stewart, I.T., D.R. Cayan, and M.D. Dettinger. 2005. Changes toward earlier streamflow timing across western North America. Journal of Climate 18(8):1136-1155.

Stollberg B.P. 1950. Food habits of shoal-water ducks on Horicon Marsh, Wisconsin. Journal of Wildlife Management 14(2):214-217.

Storer, R.W. and G.L. Nuechterlein. 1992. Western grebe (*Aechmorphorus occidentalis*) and Clark's grebe (*Aechmorphorus clarkia*). In: A. Poole and F. Gill, eds. Birds of North America, No. 26. Philadelphia, PA: Academy of Natural Sciences and American Ornithologists' Union. 24 pp.

Stynes, D.J. 2012 Economic contributions of the Chesapeake Bay Gateways and Watertrails Network to local economies. Technical Report. Michigan State University. 74 pp.

Talbot, T. 1931. The journals of Theodore Talbot, 1843 and 1849-52. Portland, OR: Binford and Mort.

Taylor A. and R. Knight. 2003. Wildlife responses to recreation and associated visitor perceptions. Ecological Applications 13(4):951-963.

Taylor, D.M. and C.H. Trost. 1987. The status of rare birds in Idaho. The Murrelet 68(3) (Autumn):69-93.

Taylor, D.M. and C.H. Trost. 1992. Use of lakes and reservoirs by migrating shorebirds in Idaho. Great Basin Naturalist 52 (2):179-184.

Taylor, D.M., C.H. Trost, and B. Jamison. 1992. Abundance and chronology of migrant shorebirds in Idaho. Western Birds 23:49-78.

Taylor, D.M. 2000. Status of the yellow-billed cuckoo in Idaho. Western Birds 31:252-254.

Thomas, C.M. and S. Burch. 2005. Evaluation of inorganic and organochlorine contaminants in sediment and biota from Lake Lowell, Deer Flat National Wildlife Refuge: final report. Snake River Fish and Wildlife Office. Boise, ID. 41 pp.

Tomback, D.F., S.F. Arno, and R.E. Keane. 2001. The compelling case for management intervention. Pages 3-25 in: D.F. Tomback, S.F. Arno, and R.E. Keane, eds. Whitebark pine communities: ecology and restoration. Washington, D.C.: Island Press.

Trulio, L.A. and J. Sokale. 2008. Foraging shorebird response to trail use around San Francisco Bay. Journal of Wildlife Management 72(8):1775-1780.

Turley, N.J.S. and A.M.A. Holthuijzen. 1999. Migrant shorebird use of mudflats along Brownlee Reservoir. Technical Report E.3.2-15 in license application for the Hells Canyon Complex. Idaho Power Company. Boise, ID. 24 pp.

U.S. Army Corps of Engineers. 2010. Pacific Northwest reservoir system. Portland District visual information, January 11, 2010. Available at Portland District office. Map available at: http://en.wikipedia.org/wiki/File:Pacific_Northwest_River_System.png. Accessed August 20, 2012.

U.S. Census Bureau. 1996. Population projections for states by age, sex, race, and Hispanic origin: 1995 to 2025. Available at: http://www.census.gov/population/projections/files/methodology/ppl47.pdf. Accessed June 3, 2013.

U.S. Census Bureau. 2010. State and county quickfacts. Available at: http://quickfacts.census.gov. Accessed February 8, 2012.

U.S. Census Bureau. 2012. American FactFinder 2. Available at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed January 18, 2012.

U.S. Department of Agriculture. 2000. Idaho natural resource trends. Available at: ftp://ftp-fc.sc.egov.usda.gov/ID/news/nri_97.pdf. Accessed January 25, 2012.

U.S. Department of Agriculture. 2009. Summary report: 2007 national resources inventory. Natural Resources Conservation Service and Center for Survey Statistics and Methodology. Washington, D.C. 127 pp.

U.S. Energy Information Administration. 2012. Gasoline and diesel fuel update. Available at: http://www.eia.gov/petroleum/gasdiesel/. Accessed March 1, 2012.

USFWS (U.S. Fish and Wildlife Service). 1990, updated in 1996. Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID. 33 pp.

USFWS and U.S. Census Bureau. 2007. 2006 national survey of fishing, hunting and wildlife-associated recreation. Available at: http://www.census.gov/prod/2008pubs/fhw06-nat.pdf. Accessed May 18, 2012.

USFWS. 1968. Master plan for Deer Flat National Wildlife Refuge. Deer Flat National Wildlife Refuge, Nampa, ID. 240 pp.

USFWS. 1970. Deer Flat National Wildlife Refuge Lake Lowell sector recreation management plan. Deer Flat National Wildlife Refuge. Nampa, ID. 45 pp.

USFWS. 1980. Master plan for Deer Flat National Wildlife Refuge. Deer Flat National Wildlife Refuge. Nampa, ID. 17 pp.

USFWS. 1994. Native American policy. Available at: http://www.fws.gov/northeast/nativeamerican/imp_plan.html. Accessed May 18, 2012.

USFWS. 1995. Recovery Plan for the Lahontan Cutthroat Trout. Available at: http://ecos.fws.gov/docs/recovery_plan/950130.pdf. Accessed June 5, 2013

USFWS. 1996 (1990, updated 1996). Refuge management plan (RMP). Deer Flat National Wildlife Refuge. Nampa, ID.

USFWS. 2000. 1998 Lake Lowell water quality assessment, Deer Flat National Wildlife Refuge, planning aid and contaminants study for U.S. Bureau of Reclamation, Snake River Area Office. USFWS, Snake River Basin Office. Boise, ID. 20 pp.

USFWS. 2002a. Writing refuge management goals and objectives: a handbook (draft). U.S. Department of Interior, Fish and Wildlife Service, National Wildlife Refuge System. Washington, D.C. 34 pp.

USFWS. 2002b. Bull trout (*Salvelinus confluentus*) draft recovery plan. U.S. Fish and Wildlife Service. Portland, OR. 7 pp.

USFWS. 2005. USFWS biological opinion for Bureau of Reclamation operations and maintenance in the Snake River Basin above Brownlee Reservoir. Snake River Fish and Wildlife Office. Boise, ID. 436 pp.

USFWS. 2007a. McNary and Umatilla National Wildlife Refuges comprehensive conservation plan and environmental assessment. U.S. Fish and Wildlife Service. Portland, OR. 27 pp.

USFWS. 2007b. USFWS five-year review of Bruneau hot springsnail. Snake River Fish and Wildlife Office. Boise, ID. 36 pp.

USFWS. 2008. Deer Flat National Wildlife Refuge wildlife and habitat management review. U.S. Fish and Wildlife Service. Portland, OR. 27 pp.

USFWS. 2009a. Wildland fire management plan: Deer Flat National Wildlife Refuge. U.S. Fish and Wildlife Service. Nampa, ID. 34 pp.

USFWS. 2009b. Identifying refuge resources of concern and management priorities: a handbook. U.S. Department of Interior, Fish and Wildlife Service, National Wildlife Refuge System. Washington, D.C.

USFWS. 2010a. Bull trout final critical habitat justification: rationale for why habitat is essential, and documentation of occupancy. Chapter 23 Mid-Columbia recovery unit—mainstem Snake River critical habitat unit. 1,035 pp.

USFWS. 2010b. Malheur National Wildlife Refuge invasive carp control workshop meeting notes, March 23-25, 2010, Community Center, Burns, OR. Available at: http://www.fws.gov/malheur/pdf/carp_workshop_notes.pdf. Accessed May 18, 2012.

USFWS. 2011a. Hunt plan, environmental assessment, and compatibility determination for a controlled mule deer hunt on the Lake Lowell Unit of the Deer Flat National Wildlife Refuge. Available at: http://www.fws.gov/deerflat/recreation/deerhuntplan.html. Accessed May 30, 2012.

USFWS. 2011b. Air quality. Available at: http://www.fws.gov/refuges/airquality/. Accessed October 2011.

USFWS. 2011c. Waterfowl population status, 2011. U.S. Department of the Interior. Washington, D.C. 80 pp.

USFWS. 2011d. Species assessment and listing priority form for the Southern Idaho ground squirrel. Available at: http://ecos.fws.gov/docs/candidate/assessments/2012/r1/A0EO_V01.pdf. Accessed May 18, 2012.

USFWS. 2011e. Species assessment and listing priority form for Packard's milkvetch. Available at: http://ecos.fws.gov/docs/candidate/assessments/2012/r1/Q3N8_P01.pdf. Accessed May 18, 2012.

USFWS. 2011f. U.S. Fish and Wildlife Service species assessment and listing priority assignment form for the Columbia spotted frog (Great Basin DPS), as of April 15, 2011. Available at: http://ecos.fws.gov/docs/candidate/assessments/2012/r8/D027_V01.pdf. Accessed June 20, 2012.

USFWS. 2011g. U.S. Fish and Wildlife Service recovery outline for *Lepidium papilliferum* (slickspot peppergrass). Available at: http://www.fws.gov/pacific/ecoservices/endangered/recovery/documents/2011_LEPA%20Recovery_Outline_Final_9-26-11.pdf. Accessed April 27, 2013.

USFWS. 2013. Species profile for southern Idaho ground squirrel. Available at: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0EO. Accessed June 5, 2013.

USGCRP (U.S. Global Climate Change Research Program). 2009. Global climate change impacts in the United States. Cambridge, United Kingdom: Cambridge University Press.

USGS (U.S. Geological Survey). 1951. Weiser South quadrangle, Idaho-Oregon. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1952. Olds Ferry SE quadrangle, Idaho-Oregon. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1967. Owyhee quadrangle, Oregon-Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1968. Adrian quadrangle, Oregon-Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1971a. Lake Lowell quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1971b. Wilder quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1971c. Homedale quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1971d. Marsing quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1974a. Olds Ferry quadrangle, Idaho-Oregon. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1974b. Moores Hollow quadrangle, Oregon-Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1974c. Payette quadrangle, Idaho-Oregon. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1975. Parma quadrangle, Idaho-Oregon. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1992a. Opalene Gulch quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1992b. Givens Hot Springs quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1992c. Wilson Peak quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 1992d. Walters Butte quadrangle, Idaho. 7.5-minute series topographic map. USGS. Denver, CO, and Reston, VA.

USGS. 2011. USGS surface-water data for Idaho. Available at: http://waterdata.usgs.gov/id/nwis/sw. Accessed July 6, 2011.

Van Daele, L.J. and H.A. Van Daele. 1982. Factors affecting the productivity of ospreys nesting in west-central Idaho. Condor 84:292-299.

Vavra, M. 2005. Livestock grazing and wildlife: developing compatibilities. Rangeland Ecology and Management 58(2):128-134.

Vickery, P.D. and J.R. Herkert, eds. 1999. Ecology and conservation of grassland birds of the western hemisphere. Studies in Avian Biology 19. Norman, OK: Cooper Ornithological Society.

Visit Idaho. 2011. Morley Nelson Snake River Birds of Prey National Conservation Area. Available at: http://www.visitidaho.org/attraction/wildlife/morley-nelson-snake-river-birds-of-prey-national-conservation-area. Accessed May 18, 2012.

Vos, D.K., R.A. Ryder, and W.D. Graul. 1985. Response of breeding great blue herons to human disturbance in northcentral Colorado. Colonial Waterbirds 8:13-22.

Washington County. 2010. Washington County comprehensive plan. Washington County, ID. 67 pp.

Watson, A.E., M.J. Niccolucci, and D.R. Williams. 1993. Hikers and recreational stock users: predicting and managing recreation conflicts in three wildernesses. Intermountain Research Station Research Paper INT-468. U.S. Forest Service. 37 pp.

West, N.E. 1996. Strategies for maintenance and repair of biotic community diversity on rangelands. Pages 327-347 in: R.C. Szaro and D.W. Johnston, eds. Biodiversity in managed landscapes: theory and practice. New York: Oxford University Press.

West, N.E. and J.A. Young. 2000. Intermountain valleys and lower mountain slopes. Pages 255-284 in: M.G. Barbour and W.D. Billings, eds. North American terrestrial vegetation. 2nd edition. Cambridge, United Kingdom: Cambridge University Press.

West, T.O. and W.M. Post. 2001. Soil organic carbon sequestration rates by tillage and crop rotation. Soil Science Society of America Journal 66(6):1930-1946.

White-Robinson, R. 1982. Inland and salt marsh feeding of wintering brent geese in Essex. Wildfowl 33:113-118.

Whitson, P.D. 1974. The impact of human use upon the Chisos Basin and adjacent lands. Scientific Monograph Series Number 4. National Park Service. 92 pp.

Whittaker, P.L. 1978. Comparison of surface impact by hiking and horseback riding in the Great Smoky Mountain National Park. Management Report 24. U.S. Department of the Interior, National Park Service. 80 pp.

Wiedmeier, C. 2011. Personal communication between Craig Wiedmeier, License Operations Supervisor, Idaho Department of Fish and Game, and Susan Kain, Visitor Services Program Manager, Deer Flat NWR, November 18, 2011, regarding historical IDFG fishing and hunting license sales.

Williams, G.L. 1985. Classifying wetlands according to relative wildlife value: application to water impoundments. Pages 110-119 in: M.D. Knighton, compiler. Proceedings of water impoundments for wildlife: a habitat management workshop. U.S. Forest Service, St. Paul, MN.

Wilson, J.P. and C.M. Ryan. 1988. Landscape change in the Lake Simcoe-Couchiching Basin, 1800-1983. Canadian Geographer/Le Géographe canadien 32(3):206-222.

Wilson, R.A. 1997. The wonders of nature: honoring children's ways of knowing. Available at: http://www.earlychildhoodnews.com/earlychildhood/article_view.aspx?ArticleID=70. Accessed May 18, 2012.

Winter, G.J., C. Vogt, and J.S. Fried, 2002. Fuel treatments at the wildland-urban interface: common concerns in diverse regions. Journal of Forestry 100(1):15-21.

Wolder, M. 1993. Disturbance of wintering northern pintails at Sacramento National Wildlife Refuge, California. M.S. thesis. Humboldt State University, Arcata, CA.

Wood, S.H. and D.M. Clemens. 2002. Geologic and tectonic history of the western Snake River Plain, Idaho and Oregon. Pages 69-103 in: Bill Bonnichsen, C.M. White, and Michael McCurry, eds. Tectonic and magmatic evolution of the Snake River Plain volcanic province. Idaho Geological Survey Bulletin 30: 69-103.

WRCC (Western Regional Climate Center). 2011a. Climate of Idaho. Available at: www.wrcc.dri.edu/narratives/IDAHO.htm. Accessed April 19, 2011.

WRCC. 2011b. Average wind direction by state. Available at: http://www.wrcc.dri.edu/htmlfiles/westwinddir.html. Accessed May 10, 2011.

WRCC. 2011c. Average wind speeds by state. Available at: http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO. Accessed July 7, 2011.

Yalden, D.W. and P.E. Yalden. 1989. The sensitivity of breeding golden plovers *Pluvialis apricaria* to human intruders. Bird Study 36:49-55.

Yanch, J. 2006. Status of the western grebe (*Aechmophorus occidentalis*) in Alberta. Alberta Wildlife Status Report No. 60. Alberta Sustainable Resource Development, Fish and Wildlife Division. Edmonton, Canada. 42 pp.

Yensen, D. 1982 A grazing history of southwestern Idaho with emphasis on the Birds of Prey Study Area. Bureau of Land Management. Boise, ID. 82 pp.

Zambrano, L., M. Scheffer, and M. Martinez-Ramos. 2001. Catastrophic response of lakes to benthivorous fish introductions. Oikos 94:344-350.

Zoellick, B.W., H.M. Ulmschneider, B.S. Cade, and A.W. Stanley. 2004a. Distribution and composition of mammalian predators along the Snake River in southwestern Idaho. Northwest Science 79(4):265-272.

Zoellick, B.W., H.M. Ulmschneider, and A.W. Stanley. 2004b. Isolation of Snake River islands and mammalian predation of waterfowl nests. Journal of Wildlife Management 68(3):650-662.