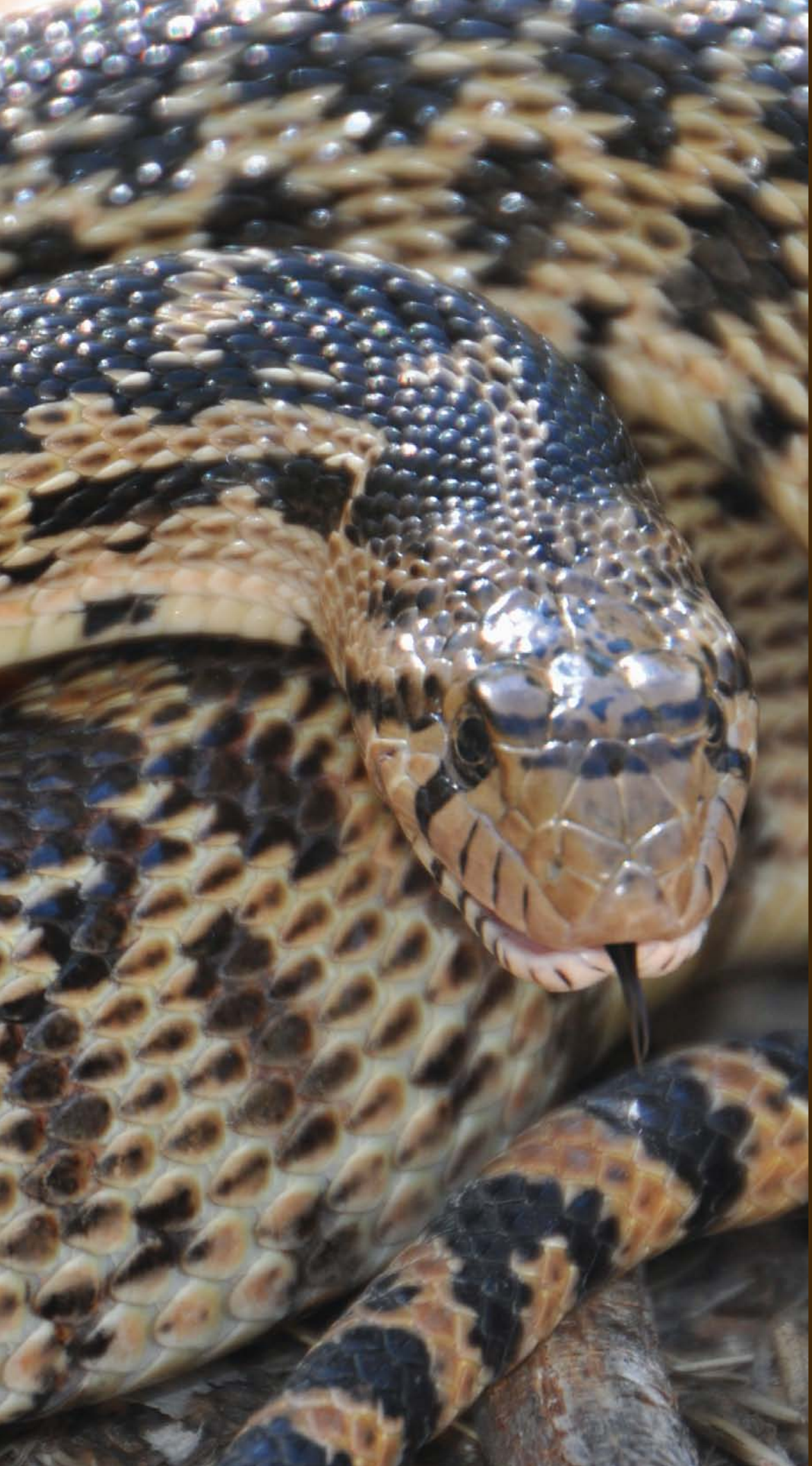

Appendices A-P

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 Refuge Manager also determined the following Refuge uses were appropriate and directed that compatibility determinations be completed for each appropriate use: individuals biking, jogging, and horseback riding; farming; grazing; recreational boating; research; swimming; beach use; picnicking; and walking with pets.

Document continues on next page.

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, 603 FW 1, 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: 2/16/2012

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 less disturbance 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 and Large-group Cycling (>10)

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, 603 FW 1, 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: 2/16/12

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 and Large-group Cycling (>10)

(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 by groups of individuals. 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 group bicycling activities include use of Refuge parking areas for start and finish lines and "watering" stops. Use of potentially busy parking areas for these activities 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 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. Bicycling in a group of four to 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, potentially negatively impacting wildlife observers and other wildlife-dependent users.

Conclusion

Because bicycling in groups 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 and Large-group Jogging (>10 individuals)

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, 603 FW 1, 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 and Large-group Jogging (>10 individuals)

(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 created by a group, potentially negatively impacting wildlife observers and other wildlife-dependent users.

Conclusion

Since competitive and group 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 and Group 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, 603 FW 1, 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 and Group 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 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 and group 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.

Document continues on next page.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Deer Flat National Wildlife Refuge

Use: Cycling and Jogging by Individuals and Small Groups (4-10 individuals)

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, 603 FW 1, 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: Cycling and Jogging by Individuals and Small Groups (4-10 individuals)

(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 (four to 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 (four to 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 small groups (with a special use permit) 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 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, 603 FW 1, 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 and help maintain diversity and has also been shown to increase native annual forb species and cover, as well as decrease vegetation height and litter depth, all of which are beneficial to foraging Canada geese (Hayes and Holl 2003).

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, Oregon: OSU Book Stores.

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, 603 FW 1, 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.

Document continues on next page.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Deer Flat National Wildlife Refuge

Use: Traditional Geocaching (burial or placement of a physcial 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, 603 FW 1, 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, 603 FW 1, 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 other 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 (pers. comm., D. Anderson, as cited in Ivey 2004), and small chicks can become separated from their parents and die of exposure if adults have to dive to avoid motorboats (Shaw 1998; 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.

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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

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, 603 FW 1, 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.

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Appropriate Use Justification

Refuge Name: Deer Flat National Wildlife Refuge

Use: Horseback Riding by Individuals

(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.

(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, 603 FW 1, 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
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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 that rely on the structural integrity of the ice on Lake Lowell to enjoy their sport. According to the National Weather Service (accessed online at http://www.rssweather.com/climate/Idaho/Boise/), average monthly high temperatures in the Treasure Valley do not reach freezing levels. Combining this with high winds and long fetch makes the freezing of the water on Lake Lowell very unpredictable and any frozen areas of the lake unsafe. Signs are posted near recreation areas warning the public to stay off the ice because systematic ice evaluations by qualified personnel are not conducted on Lake Lowell.

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, 603 FW 1, 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, 603 FW 1, 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, 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, 603 FW 1, 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 limiting swimming to small 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 only be allowed in 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 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 swimming would be limited to 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

Limiting swimming to 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 next page.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Deer Flat National Wildlife Refuge

Use: Walking with Pets

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, 603 FW 1, 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

(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 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), 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 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 and on designated trails 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) and the Lower Dam Recreation Area 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 and only on multiuse trails, 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.

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Appendix B. Compatibility Determinations

Introduction

The compatibility determinations (CDs) developed during the comprehensive conservation planning process evaluate uses projected to occur under Alternative 2, the Preferred Alternative in the comprehensive conservation plan/environmental impact statement (CCP/EIS) for the Deer Flat National Wildlife Refuge.

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.

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 re-evaluated 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 re-evaluated 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 Re-evaluation	Page
Farming and grazing	Yes	2023	B-5
Fishing	Yes	2028	B-17
Horseback riding, jogging, and bicycling	Yes	2023	B-31
Hunting deer	Yes	2028	B-43
Hunting waterfowl and upland birds	Yes	2028	B-51
Recreational boating	Yes	2023	B-65
Research	Yes	2023	B-77
Swimming, beach use, and picnicking	Yes	2023	B-85
Walking with pets	Yes	2023	B-95
Wildlife observation, photography, interpretation, and environmental education	Yes	2028	B-103

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, will 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.

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.

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B.1 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 re-established 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, re-establishing 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 and help maintain diversity and has also been shown to increase native annual forb species and cover, as well as decrease vegetation height and litter depth, all of which are beneficial to foraging Canada geese (Hayes and Holl 2003).

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 are solicited in conjunction with release of this 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 will

complement the marsh habitat on the Leavitt Tract and providing 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 Re-evaluation Date

__2023___ Mandatory 10-year Re-evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

___X____ Environmental Impact Statement and Record of Decision

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Refuge Determination

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.2 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 re-established 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 except during waterfowl hunting season when shoreline fishing is restricted to Fishing Areas A and B, 200 yards in front of the Lower and Upper Dams. During that time, fishing from human-powered boats is also allowed in Fishing Areas A and B. 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 and at Murphy's Neck. 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.

    - 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:
    - 300-yard buffer around eagle nests February 15 through July 15.
    - Winter waterfowl closure at Gotts Point October 1 through January 31.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1
    - 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.
- 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.

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 will be a part of an overall fisheries management plan that will 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 fisherman 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 are solicited in conjunction with release of this 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 will 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 and at Murphy's Neck. 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.
    - 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1.
    - 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 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.
- No live, nonnative aquatic bait would be allowed as per Service policy (605 FW 3).
- Open fires would be prohibited.
- Ice fishing would be prohibited.

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 water birds 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 Re-evaluation Date

__2028___ Mandatory 15-year Re-evaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

__X___ Environmental Impact Statement and Record of Decision

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Refuge Determination

Prepared by: _____ _____
(Signature) (Date)

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

Concurrence:

Refuge Supervisor: _____ _____
(Signature) (Date)

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

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B.3 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 re-established 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 the Lake Lowell Unit of Deer Flat NWR 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. Refuge counts estimate the number of walkers/joggers in 2010 at around 16,500, but there are no data for equestrians or cyclists. All three of the uses described in this CD were addressed and deemed compatible in 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 purpose of the Refuge and National Wildlife Refuge System mission. The Refuge would manage these uses in a manner so as to reach out to nontraditional Refuge user groups 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, multiple-use trails may provide an introduction to a national wildlife refuge.

Each of the proposed uses is described in more detail below.

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 four horses and riders would be required to obtain an SUP. Groups larger than 10 people would not be allowed to use the Refuge; large groups could restrict use for other wildlife-dependent users because of 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. Special group events such as competitions, training, and practice meets would not be allowed on the Refuge because they are not

wildlife-dependent events and would have the potential of impacting visitors trying to participate 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, a use that 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 because of automobile/bicycle safety concerns. Groups of more than four cyclists would be required to obtain an SUP. Groups larger than 10 people would not be allowed to use the Refuge; large groups may restrict use for other wildlife-dependent users because of limited space on trails. 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, volunteers, interns, and various user groups can assist the Refuge 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; 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.

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 the former groups move quickly (joggers) or create more noise (landscapers). 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 will 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 and is successfully utilized on other public lands in the area (e.g., Military Park in Boise). Trail etiquette signing would clearly state 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 are solicited in conjunction with release of this 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 multitrail use. Pedestrians and bicyclists must yield to equestrians.
- Organized horseback, bicycling, or jogging groups of more than four riders may be permitted under an SUP issued to the group leader. Groups larger than 10 people would not be allowed to use the Refuge. 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1.
    - 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 Re-evaluation Date

__2023___ Mandatory 10-year Re-evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

___X___ Environmental Impact Statement and Record of Decision

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Refuge Determination

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 next page.

B.4 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 re-established 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.

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- Published Notice of Intent in the Federal Register
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- 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 are solicited in conjunction with release of this 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 Re-evaluation Date

__2028___ Mandatory 15-year Re-evaluation (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. Annual report, Project W-170-R-33. Idaho Department of Fish and Game, Boise, ID.

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.

Refuge Determination

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 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 re-established 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.
    - The addition of a youth hunt would be allowed in a designated area east of Parking Lot 1.
    - 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. Neither unit of Deer Flat NWR is considered a destination hunt for upland bird hunters, 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; Thomas 1983; 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; 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.

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
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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

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- 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 are solicited in conjunction with release of this 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.
- 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 only in designated area east of Parking Lot 1.
    - 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1.
    - 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 Re-evaluation Date

__2028___ Mandatory 15-year Re-evaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

___X___ Environmental Impact Statement and Record of Decision

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Refuge Determination

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 Recreational Boating

RMIS Database Use: 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 re-established 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 FY11 with a majority of these being motorized boats. In FY11, 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. 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - Winter waterfowl closure at Gotts Point from October 1 through January 31.
    - 250-yard buffer around heron rookeries from February 1 through July 1.
    - 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 limit 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 Department. If the Sheriff's Department ever decided to discontinue this

assistance, there would be additional costs associated with maintaining this use. Because the Sheriff's Department 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, volunteers, interns, and various user groups can assist the Refuge 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 (pers. comm. D. Anderson, as cited in Ivey 2004), and small chicks can become separated from their parents and die of exposure if adults have to dive to avoid motorboats (Shaw 1998; 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
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Winter 2013: Draft CCP/EIS Outreach and Comment Period

Public review and comments are solicited in conjunction with release of this 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 or group activities are allowed.
- 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1.
    - 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.
- 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 Re-evaluation Date

__2023___ Mandatory 10-year Re-evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

___X___ Environmental Impact Statement and Record of Decision

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Refuge Determination

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 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 re-established 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 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, 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 are solicited in conjunction with release of this 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 Re-evaluation Date

__2023__ Mandatory 10-year Re-evaluation (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

Refuge Determination

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 Swimming, Beach Use, and Picnicking (including Lower Dam Recreation Area Use)

RMIS Database Use: Swimming and beach use, 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 re-established 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 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, swimming and beach use would be allowed in the existing area near the Upper Dam and at a designated swimming area at the Lower Dam Recreation Area. Swimming would also be allowed in the open water of Lake Lowell from boats outside of no-wake zones. In order to separate swimmers and beach users from 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, swimming from shore would not be allowed outside of the designated swimming areas. 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 limiting shoreline access to swimming 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.

Availability of Resources

Deer Flat NWR is open to swimming 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 (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. 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, volunteers, interns, and various user groups can assist the Refuge 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. The Refuge currently maintains swimming buoys within current funding levels.

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-8. 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; 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.

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 shoreline swimming contained to designated areas will 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 restricted 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 limiting shoreline access to swimming 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.

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 are solicited in conjunction with release of this 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

- Beach activities, including picnicking, would be permitted only in designated areas at the east end of the Upper Dam and at the Lower Dam Recreation Area from April 15 through September 30. Swimming would be allowed in these designated areas as well as 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 group events (e.g., weddings, birthday parties, memorial services, retreats) would be allowed only at the Lower Dam Recreation Area and by SUP. Permits may include restrictions on tent size, attendance, noise-causing devices, inflatables, or any other items that could impact visitor safety or the ability of other visitors to use the Refuge in an unobstructed way.
- 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1
    - 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 that would be made available for swimming and beach use, 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 limiting shoreline swimming 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 Re-evaluation Date

__2023__ Mandatory 10-year Re-evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

__X__ Environmental Impact Statement and Record of Decision

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Refuge Determination

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 next page.

B.9 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 re-established 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 to visit with their leashed pets on designated multi-use trails. Leashed pets would be allowed on designated trails 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-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 appropriate training, volunteers, interns, and various user groups can assist the Refuge 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 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-9. Costs to Implement Improvements Necessary to Allow Pet Walking on Designated Trails

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 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 leash and on multiuse trails. 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, and the Observation Hill Trail System. Keeping pets on designated trails 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 are solicited in conjunction with release of this 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, 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.
- Visitors walking with a pet on designated trails 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.

  - 150-yard seasonal closure around osprey nests from March 15 through August 1.
  - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
  - 250-yard buffer around heron rookeries from February 1 through July 1.
  - 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, 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 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 re-evaluated. 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. 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, multiple-use trails 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 Re-evaluation Date

2023 Mandatory 10-year Re-evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision

___X___ Environmental Impact Statement and Record of Decision

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Refuge Determination

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.10 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 re-established 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 nests, grebe colonies, osprey nests, 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-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 appropriate training, volunteers, interns, and various user groups can assist the Refuge 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 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-10. 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	

Refuge Activity Required to Allow Use	Estimated One-time Cost	Estimated Annual Cost
*Rehabilitate LDRA parking area	$50,000	
*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 are solicited in conjunction with release of this 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.
- 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:
    - 300-yard buffer around eagle nests from February 15 through July 15.
    - 150-yard seasonal closure around osprey nests from March 15 through August 1.
    - 500-yard closure around grebe colonies until July 15 of the following year. If the birds have not re-nested 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.
    - 250-yard buffer around heron rookeries from February 1 through July 1.
    - 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 Re-evaluation Date

2028 Mandatory 15-year Re-evaluation (for priority public uses)

NEPA Compliance for Refuge Use Decision

X Environmental Impact Statement and Record of Decision

References

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Refuge Determination

Prepared by: _____ _____
(Signature) (Date)

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

Concurrence:

Refuge Supervisor: _____ _____
(Signature) (Date)

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

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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 are included in the Refuge Management Information System (Refuge Operational Needs System [RONS] or Maintenance Management System [MMS]), which is 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. The RONS documents proposed new projects to implement the CCP to meet the Refuge's goals and objectives and legal mandates.

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.

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 current budget for nonstaff costs is 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. In some instances, the alternatives would show a savings from what is currently spent.

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 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 lead 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. During 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, and in some instances fewer buoys would be needed. Since the buoy replacements needed for the status quo alternative are accounted for in the base operations budget, some alternatives would require fewer buoys and therefore represent a savings in this area. Table C-10 displays the reduction in cost or additional cost required to meet requirements of the Service Sign Manual 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, and swimming areas	-	$4	-	-	H
Seasonally closed areas	-	$1	-	-	H
Total for Buoys	-	**$5**	-	-	

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., 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	-	$5	-	-
Signs	$5	$12	$12	$12
Subtotal	**$5**	**$17**	**$12**	**$12**
Public Use Enhancements				
Boardwalk	-	-	$5,848	-
Trails and signs	$80	$436	$410	$262
Docks and blinds	$25	$193	$211	$130

	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Kiosks	-	$262	$262	$262
Environmental education and interpretation facilities	$624	$1,106	$1,106	$1,066
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**	**$2,798-$2,803**	**$8,672-$8,677**	**$2,289-$2,294**

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	-	$200	$200	$200	M

Public Use Survey and Research Needs	Alternative 1 (Status Quo)	Alternative 2 (Preferred)	Alternative 3	Alternative 4	Priority
	Cost	Cost	Cost	Cost	
Leavitt Tract					
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. 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
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	WG-4749-08
Administrative Assistant	PFT	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 2 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 1060 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 apply:

- 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

Document continues on next page.

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 Draft 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 comprehensive resources of concern table 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 (MBCC) 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	MBCC 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,*	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.

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
	sandhill crane, mallard, and Great Basin spadefoot toad.		
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 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.*	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, 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	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

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
	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.*		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 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.*	Periodic, seasonal flood events; riparian habitat connectivity; submergent vegetation, upland scrub. Spring flows create scours and cut new channels that isolate islands.	Encroachments of invasive plant species include salt cedar, Russian olive, poison hemlock, cheatgrass, and nonnative grasses. 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	Open, generally flowing water; potentially	Periodic flooding with flood energy	Agriculture ad open pasture; excess

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
• Lower perennial	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.*	variable depending on location of stream/river in landscape, perennial water flows, open water, submergent vegetation.	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. Periodic flooding of river plain and lowland areas naturally provides islands of refuge and forage.	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. 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[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					23H	5			G5, S5B, S3		X				
American bittern * (*Botaurus lentiginosus*)	X	X					19M		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					24H		H	X	G3, S1B	Type 2				X	
American wigeon* (*Anas americana*)	X	X			X										X		
Ash-throated flycatcher (*Myiarchus tuberculifer*)							18M										
Baird's sandpiper (*Calidris bairdii*)	X	X						1									
Bald eagle * (*Haleaeetus leucocephalus*)	X	X					19M				G4, S3B, S4N, E	Type 1				X	PR
Bank swallow * (*Riparia riparia*)		X															
Barrow's goldeneye (*Bucephala islandica*)	X	X			X	X	24H					Type 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[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					23H				G4, S3						PR
Black tern (*Chlidonias niger*)	X	X					18M		H	X	G4, S1B, S1	Type 3				X	
Black-bellied plover (*Pluvialis squatarola*)	X							2									
Black-billed magpie * (*Pica hudsonia*)							19H										
Black-capped chickadee * (*Poecile atricapillus*)							13M										
Black-chinned hummingbird * (*Archilochus alexandri*)		X					23H										
Black-crowned night heron * (*Nycticorax nycticorax*)	X	X							M-9	X	G5, S2B						
Black-necked stilt * (*Himantopus mexicanus*)	X	X					18H	5			G5, S3B, S3						
Black-throated gray warbler (*Dendroica nigrescens*)							22H										PR
Black-throated sparrow (*Amphispiza bilineata*)		X					21M				S2B	Type 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*)							15M					Type 5					
Brewer's sparrow (*Spizella breweri*)							24H				G5, S3B	Type 3	X	X			MA

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[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]
Broad-tailed hummingbird * (*Selasphorus platycercus*)		X															
Brown creeper (*Certhia americana*)							18H										
Bufflehead (*Bucephala albeola*)	X	X			X		18M										
Bullock's oriole * (*Icterus bullockii*)							19M										
Burrowing owl (*Athene cunicularia*)		X	SOC				19M				G4, S2B, S2	Type 5	X	X			
Bushtit * (*Psaltriparus minimus*)							18M										
California gull * (*Larus californicus*)	X						19M		M-10	X	G5, S2B, S3N						
Calliope hummingbird (*Stellula calliope*)							23H					Type 3					PR
Canada goose * (*Branta canadensis*)	X	X		X	X												
Canvasback (*Aythya valisineria*)	X				X		20M				S2N				X		
Canyon wren * (*Catherpes mexicanus*)		X					18M										
Caspian tern * (*Sterna caspia*)	X	X					17M		M-10	X	G5, S2B						
Cassin's finch (*Carpodacus cassinii*)							19M					Type 5					MA
Cassin's vireo (*Vireo cassinii*)							X										
Cattle egret (*Bubulcus ibis*)	X									X	G5, S2B						
Chipping sparrow (*Spizella passerina*)							16M										

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[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]
Cinnamon teal * (*Anas cyanoptera*)	X	X			X	X	21H										
Clark's grebe (*Aechmophorus clarkii*)	X						20M		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*)							21M										
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																
Dark-eyed junco (*Junco hyemalis*)							13M										
Double-crested cormorant * (*Phalacrocorax auritus*)	X	X								X							
Dunlin (*Calidris alpina*)	X	X						2									
Eared grebe * (*Podiceps nigricollis*)	X						15M		H-9	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[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]
Ferruginous hawk (*Buteo regalis*)	X	X					23H				G4, S3B	Type 3	X	X		X	
Forster's tern (*Sterna forsteri*)	X						20M		H-10/ M-9	X	G5, S1B, S1					X	
Fox sparrow (*Passerellailiaco*)																	
Franklin's gull (*Larus pipixcan*)	X						24H		H	X	G4G5, S2B					X	
Gadwall* (*Anas strepera*)	X				X	X	17M										
Glaucous gull (*Larus hyperboreus*)	X									X							
Golden eagle (*Aquila chrysaetos*)	X						19H						X				
Golden-crowned kinglet (*Regulus satrapa*)	X																
Grasshopper sparrow (*Ammodramus savannarum*)		X					20H				G5, S2B	Type 5		X		X	MA
Gray flycatcher (*Empidonax wrightii*)	X						24H										
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					19M					Type 5				X	PR

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[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]
Green-winged teal * (*Anas crecca*)	X	X			X												
Gyrfalcon (*Falco rusticolus*)	X																PR
Harlequin duck (*Histrionicus histrionicus*)	X				X	X	20M				G4, S1B	Type 4			X		
Harris' sparrow (*Zonotrichia querula*)														X			
Herring gull (*Larus argentatus*)	X									X							
Hooded merganser * (*Lophodytes cucullatus*)	X	X			X		22H				G5, S2B, S3N						
Horned grebe (*Podiceps grisegena*)	X										S1						
Horned lark * (*Eremophila alpestris*)		X												?			
Indigo bunting (*Passerina cyanea*)																	PR
Killdeer * (*Charadrius vociferus*)	X	X					19H	3									
Lapland longspur (*Calcarius lapponicus*)																	PR
Lark sparrow * (*Chondestes grammacus*)							20H										
Lazuli bunting (*Passerina amoena*)		X					19M										
Least bittern (*Ixobrychus exilis*)	X								M-9								
Least sandpiper (*Calidris minutilla*)	X	X						4									
Lesser scaup (*Aythya affinis*)	X	X			D		17M				G5, S3				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[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]
Lesser yellowlegs (*Tringa flavipes*)	X							2									
Lewis's woodpecker * (*Melanerpes lewis*)		X					23H				G4, S3B	Type 3	X	X		X	MA
Lincoln's sparrow (*Melospiza lincolnii*)																	PR
Loggerhead shrike * (*Lanius ludovianus*)		X	SOC				20H					Type 3	X	X		X	
Long-billed curlew (*Numenius americanus*)	X	X	SOC				23H	5			G5, S2B	Type 5	X	X		X	
Long-billed dowitcher (*Limnodromus scolopaceus*)	X							5									
MacGillivray's warbler (*Oporornis tolmiei*)							21H										
Mallard * (*Anas platyrhychos*)	X	X			X												
Marbled godwit (*Limosa fedoa*)	X							4			S2		X	X			
Marsh wren * (*Cistothorus palustris*)		X					20M										
Mountain bluebird (*Sialia currucoides*)							X										PR
Mountain chickadee (*Poecile gambeli*)							16M										
Mourning dove * (*Zenaida macroura*)		X		X											X		
Nashville warbler (*Vermivora ruficapilla*)							20M										
Northern flicker * (*Colaptes auratus*)		X					15M										
Northern goshawk (*Accipiter gentilis*)	X		SOC				21H					Type 3				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[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]
Northern harrier * (*Circus cyaneus*)	X	X					18M							X			
Northern pintail* (*Anas acuta*)	X	X			X D						G5, S5B, S2N				X		
Northern pygmy-owl (*Glaucidium gnoma*)		X					X					Type 5					
Northern rough-winged swallow * (*Stelgidopteryx serripennis*)							19M										
Northern shoveler * (*Anas clypeata*)	X	X			X						S2N						
Long-tailed duck – Oldsquaw (*Clangula hyemalis*)	X	X			X												
Olive-sided flycatcher (*Contopus cooperi*)							21H					Type 3		X			MA
Orange-crowned warbler (*Vermivora celata*)																	
Osprey * (*Pandion haliaetus*)	X	X					17M										
Pectoral sandpiper (*Calidris melanotos*)	X							1									
Peregrine falcon (*Falco peregrinus*)	X	X					19M				G4T3, S2B, E	Type 3	X	X		X	PR
Pied-billed grebe * (*Podilymbus podiceps*)	X	X															
Pine siskin (*Carduelis pinus*)							14M										
Plumbeous vireo (*Vireo plumbeus*)							22H										
Prairie falcon (*Falco mexicanus*)	X	X					24H					Type 3	X	X			
Red knot (*Calidris canutus*)	X							1						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[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 merganser (*Mergus serrator*)	X	X			X												
Red-breasted nuthatch (*Sitta canadensis*)							14M										
Redhead * (*Aythya americana*)	X	X			X	X	22H										
Red-necked phalarope (*Phalaropus lobatus*)	X	X						4									
Red-tailed hawk * (*Buteo jamaicensis*)	X	X															
Ring-billed gull * (*Larus delawarensis*)	X						15M			X							
Ring-necked duck (*Aythya collaris*)	X				X		20M								X		
Rock wren * (*Salpinctes obsoletus*)							19H										
Ross's goose (*Chen rossii*)	X	X			X												
Rough-legged hawk (*Buteo lagopus*)	X	X															PR
Ruddy duck* (*Oxyura jamaicensis*)	X				X	X	19M				S2N						
Rufous hummingbird (*Selasphorus rufus*)							22H							X			MA
Sabine's gull (*Xema sabini*)	X									X							
Sage sparrow (*Amphispiza belli*)		X					25H					Type 3	X			X	PR
Sage thrasher * (*Oreoscoptes montanus*)		X					22H					Type 5				X	PR
Sanderling (*Calidris alba*)	X							1					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[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]
Sandhill crane (*Grus canadensis*)	X	X		X			24H				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					18H										
Short-eared owl * (*Asio flammeus*)							23H				G5, S4	Type 5		X			MA
Snow bunting (*Plectrophenax nivalis*)																	PR
Snow goose (*Chen caerulescens*)	X	X			X										X		
Snowy egret (*Egretta thula*)	X	X					14M		H-9/ M-10	X	G5, S2B					X	
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*)							17M										
Stilt sandpiper (*Calidris himantopus*)	X	X						1						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[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]
Swainson's hawk * (*Buteo swainsoni*)	X	X					23H				G5, S3B	Type 5	X	X			MA
Swainson's thrush (*Catharus ustulatus*)																	
Townsend's solitaire (*Myadestes townsendi*)							19M										
Townsend's warbler (*Dendroica townsendi*)							22H										
Trumpeter swan (*Cygnus buccinator*)	X	X	SOC	X	X	X	26H				G4, S1B, S2N	Type 3			X	X	
Tundra swan (*Cygnus columbianus*)	X	X		X	X												
Varied thrush (*Ixoreus naevius*)							22H										PR
Vaux's swift (*Chaetura vauxi*)	X						23H					Type 5					
Vesper sparrow * (*Pooecetes gramineus*)							16M										
Violet-green swallow * (*Tachycineta thalassina*)		X					17M										
Virginia rail * (*Rallus limicola*)	X																
Warbling vireo (*Vireo gilvus*)							18M										
Western grebe * (*Aechmophorus occidentalis*)	X	X					22H		H-9/ M-10	X	G5, S2B						
Western kingbird * (*Tyrannus jerticalis*)																	
Western meadowlark * (*Sturnella neglecta*)		X					18H										
Western sandpiper (*Calidris mauri*)	X	X						4									

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[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 screech owl * (*Otus kennicottii*)		X															
Western tanager * (*Piranga cudoviciana*)							20H										
Western wood-pewee (*Contopus sordidulus*)							17M										
White-faced ibis (*Plegadis chihi*)	X	X	SOC				20H		M	X	G5, S2B	Type 4					
White-throated sparrow (*Zonotrichia albicollis*)																	PR
White-throated swift * (*Aeronautes saxatalis*)	X	X					18M										MA
White-winged scoter (*Melanitta fusca*)	X	X			XD												
Willet (*Catoptrophorus semipalmatus*)	X						20M	4									
Willow flycatcher (*Empidonax trailii*)							21H					Type 3					MA
Wilson's phalarope (*Phalaropus tricolor*)	X	X					21M	5			G5, S3B	Type 5	X	X			
Winter wren (*Troglodytes troglodytes*)																	
Wood duck * (*Aix sponsa*)	X				X		19M								X		
Yellow warbler * (*Dendroica petechia*)							18H										
Yellow-billed cuckoo* (*Coccyzus americanus*)		X	SOC				19M				G5, S2B	Type 1	C	LT /L E			
Yellow-breasted chat * (*Icteria virens*)		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[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]
Yellow-headed blackbird * (*Xanthocephalus xanthocephalus*)		X					18M										PR
Yellow-rumped warbler (*Dendroica coronata*)							16M										
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	Type 2					
Western toad (*Bufo boreas*)		X	SOC														
REPTILES																	
Western longnose snake (*Rhinicheilus lecontei*)		X									G5, S2	Type 3					

Table E-3. 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 - Longterm 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.

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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	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

Suggested Focal Species	Habitat Type	Habitat Structure	Life History Requirement*	Other Benefiting Species
		including cattail, bulrush spp., reed spp., smartweed, and duckweed.		
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 with Baltic rush, spikerush, bulrush, salt grass, bur-reed, and cattail. Minimal human disturbance during late spring and summer.	Nesting and loafing	Pied-billed grebe, Clark's grebe, eared grebe, canvasback, American coot
Canada goose ***Branta canadensis***			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	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	heights associated with patchy distribution including bitterbrush, saltbrush, rabbitbrush; open understory of bare ground, native perennial forbs 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	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***	Permanent cover of sagebrush; semipermanent, emergent willow			
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.	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***				

Suggested Focal Species	Habitat Type	Habitat Structure	Life History Requirement*	Other Benefiting Species
		Residual crops of corn; cropland area buffered by at least 250 meters to minimize human disturbance.		

*"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*
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*

Common Name	Family	Genus	Species
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*
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*

Common Name	Family	Genus	Species
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*
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*

Common Name	Family	Genus	Species
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.
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*

Mammals			
Common Name	**Family**	**Genus**	**Species**
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*
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*

Birds			
Common Name	**Family**	**Genus**	**Species**
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*
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*

Birds			
Common Name	**Family**	**Genus**	**Species**
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*
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*

Birds			
Common Name	**Family**	**Genus**	**Species**
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*
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*

Birds			
Common Name	**Family**	**Genus**	**Species**
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*
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*

Birds			
Common Name	**Family**	**Genus**	**Species**
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*
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*

Birds			
Common Name	**Family**	**Genus**	**Species**
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		
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*	*duodecimpunctata*
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		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
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		
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		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
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*	*?*
	Hymenoptera (Bees, Wasps and Ants)		*Forelius*	*pruinosus* (*Royer*)
	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		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
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		
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		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
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*
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*

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
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*
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		

Insects				
Common Name	**Order**	**Family**	**Genus**	**Species**
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)			
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*

Fish			
Common	**Family**	**Genus**	**Species**
Lahontan cutthroat trout	Salmonidae	*Oncorhynchus*	*clarkii 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.

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Appendix F. Statement of Compliance

STATEMENT OF COMPLIANCE[1]
for Implementation of the
Deer Flat National Wildlife Refuge, Headquartered in Nampa, Canyon County, Idaho
(and 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).

- **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

[1] See 602 FW 3, Exhibit 2 for other potential compliance requirements.

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.

_____	_____
Chief, Division of Planning, Visitor Services, and Transportation	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[a]	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.

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Appendix H. Public Involvement

Scoping Summary Report: Deer Flat NWR Comprehensive Conservation Plan

July 15, 2010-March 31, 2012

H.1 Scoping Effort

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, archeologist 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 archeologist 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.
- 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.
  - 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.

H.1.2.3 Presentations for 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.

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.

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.

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.

H.1.3.6 Press Coverage (April 1, 2010, to March 31, 2012)

- April 14, 2010. Idaho Press-Tribune, "Deer Flat Prepares to Update Conservation Guidelines."
- May 02, 2010. Idaho Press-Tribune, "County Seeks Full Access to Popular Recreation Spot."
- May 02, 2010. NWCN, "Some Residents Want Vehicle Ban Lifted on Lake Lowell Recreation Spot."
- May 05, 2010. Idaho Press-Tribune, "Public Can Give Views on Lake Lowell Water."
- May 13, 2010. Idaho Press-Tribune, "Find Way to Open Gates at Gotts Point."
- June 16, 2010. Idaho Press-Tribune, "Lake Lowell Flush with Water."
- 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."
- 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."
- July 29, 2010. Idaho Press-Tribune, "Refuge Seeks to Save Water Sports."
- 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 11, 2010. Idaho Press-Tribune, "Help Save Recreation on Lake Lowell."
- August 12, 2010. KTRV-TV, "Lake Lowell Activities Debate."
- August 13, 2010. KIVI-TV, "Public to Weigh in on Lake Lowell Management Plan."
- 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."
- August 14, 2010. KTVB and NWCN, "Public Weighs in on Future of Boating at Lake Lowell."
- August 15, 2010. KTVB, "Wildlife Refuge Could Curtail Water Sports on Popular Lake."
- August 15, 2010. Idaho Press-Tribune, "Crowd Defends Lake Use."
- August 17, 2010. Idaho Statesman online blog, "Boaters Gear Up for Fight at Lake Lowell."
- August 24, 2010. KTRV-TV "Canyon County Commissioners Call on Citizens."
- August 26, 2010. Idaho Press-Tribune, "'Save Lake Lowell' Meeting Today."
- August 27, 2010. Idaho Press-Tribune, "'Save Lake Lowell' Group Meets."
- August 29, 2010. Idaho Press-Tribune, Opinion, "Lake's Uses Must Be Balanced."

- 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."
- September 02, 2010. Idaho Press-Tribune, "Officials Support Lowell Recreation."
- September 03, 2010. Idaho Press-Tribune, "Lake Lowell Issue Continues Debate."
- September 04, 2010. Idaho Press-Tribune, "Lowell Plan Shapes Future."
- September 08, 2010. Idaho Press-Tribune, Deer Flat editorial opinion, "Wildlife, Recreation Can Co-exist."
- 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."
- September 10, 2010. KTVB, "Refuge Managers Receive Hundreds of Comments on Future of Lake Lowell."
- September 11, 2010. Idaho Press-Tribune, "Simpson, Minnick Weigh in on Lake Lowell, Wolves."
- September 12, 2010. Idaho State Journal, "Minnick, Simpson Send Letter Seeking Progress on Wolf Management, Lake Lowell Issues."
- September 13, 2010. Northwest Cable News, "Refuge Managers Receive Hundreds of Comments on Future of Lake Lowell."
- September 15, 2010. ONEARTH Magazine and KBOI, "A Gem in the Desert or Garbage Dump?"
- 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."
- 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."
- January 13, 2011. Idaho Press-Tribune, "Local Leaders Concerned about Deer Flat Outcome."
- February 21, 2011. Idaho Press-Tribune, "Deer Flat Debate Escalates."
- March 17, 2011. Idaho Press-Tribune, "Simpson Seeks Assurances on Lake Lowell."
- April 13, 2011. KTVB, "Canyon County Wants More Control over Wildlife Refuge."
- May 27, 2011. KTVB, "Proposed Changes to Lake Lowell."
- May 28, 2011. Idaho Press-Tribune, "Four Options, One Lake."
- May 28, 2011. Idaho Statesman, "Recreation Restrictions Loom for Lake Lowell."
- May 29, 2011. Westport News.
- June 24, 2011. KTVB, "Idaho Leaders Want More Public Comments on Lake Lowell."
- July, 2011. The Golden Eagle, "Comments Sought on Deer Flat Birding and New Management Plan Proposals."

- July 07, 2011. KTVB and KIVI, "Embroiled in Fight, Idaho Refuge Meets with Public."
- July 09, 2011. KIVI, "The Day Recreation Died."
- July 11, 2011. Capital Press, "Boat Parade Protests 'Death of Recreation'."
- July 21, 2011. Idaho Public Television, "Idaho's Deer Flat National Wildlife Refuge Plan Stirs Controversy."
- 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."
- July 30, 2011. KTVB, "Otter Spars with Feds over Control of Lake Lowell."
- August 25, 2011. Fox News, "Taking Liberties: Birds Vs. Boaters."
- October 20, 2011. Idaho Public Television, "The People's Land."
- October 25, 2011. KTVB, "Updated Conservation Plan for Deer Flat Refuge Released."
- 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."
- March 18, 2012. Idaho Press-Tribune, "Canyon County Sheriff Candidates Discuss Lake Lowell, Jail at Forum."

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.

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

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.

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 Summary of Responses

More than 900 comments were received between the release of the Notice of Intent and Planning Update 1 and the release of the preliminary draft alternatives and Planning Update 3. And over 300 comments were received after the preliminary draft alternatives and Planning Update 3 were released to the public. These comments described concerns and provided suggestions for managing the Refuge. Comments were received by mail, email, phone, in person, and by fax. In addition to these comments, two petitions signed by a total of 669 people were received, as well as two form letters sent/signed by an additional 93 people.

Comment Delivery Types	
Email	870
Comment card	132
Letter	169
Meeting	5
Phone	31
Petition	2
Form letter	2

The majority of comments were received from Idaho; however, comments were also received from Arizona, California, Michigan, Nevada New Jersey, Vermont, Washington, and Wyoming. Each idea formulated in a comment was categorized into a theme and subtheme. Some comments included thoughts on several different topics, which were each categorized into their own theme and subtheme. Thoughts contained within comments fell into 29 themes and 68 subthemes; the number of individual ideas received within each theme is presented in Table 1. To view a list of categorized comments, please visit the Deer Flat Planning website at http://www.fws.gov/deerflat/refugeplanning.html.

H.3 Comment Content Summaries

H.3.1 Alternatives

Comments were received that supported or opposed the different alternatives. The ideas and concerns addressed by these comments are summarized under each individual theme below.

H.3.2 Refuge Access

H.3.2.1 Gotts Point

Comments received both requested that Gotts Point be reopened and pointed out the positive aspects to having the area closed to vehicles. Comments voiced concern that anglers are not physically able to walk to the point, requested access to Gotts Point for wind sports, asked for better disabled access, asked for improved law enforcement, and requested that the area be closed at night if it is reopened. Reasons for keeping Gotts Point closed included the reduction of trash and vandalism. Gotts Point was referred to as a favorite fishing spot, the best shoreline fishing spot, and a good spot for bank fishing. It was difficult to discern whether some of the commenters knew that Gotts Point is currently open to walkers.

H.3.2.2 Refuge Access

These comments included the desire for closed areas to be open, better access to the water's edge with stairs on every beach, and keeping gates open as much as possible.

H.3.2.3 Trails

Trails in new areas (including a trail around the entire lake), improved paths to the lake providing easier access for human-powered boats, and use of fire breaks as trails were suggested in some of the submitted comments. Some comments proposed the use of paths for walking, bicycling, horseback riding, and running, while others asked for jogging, dog-walking, and horseback riding to be restricted to roads. Some comments also suggested wildlife-dependent and nonwildlife-dependent uses be allowed on separate trails and that the trails be used to increase education. A bicycle trail around the entire Refuge was also suggested. The new trail proposals found in the action alternatives received mixed reviews. Comments were received that thought the boardwalk was both a good idea and overly ambitious, while only positive feedback was received about the trail in Murphy's Neck. There was also a request for a trail from Parking Lot 5.

H.3.3 Planning Process

Comments included discussion of priority and non-priority recreation definitions, the quality of scientific information, requests for extension of the comment period, and approval of the planning process.

H.3.4 Wildlife-dependent Recreation

H.3.4.1 Environmental Education

Most of these comments expressed support for environmental education. Some comments stated that recreational activities give them the opportunity to help their families learn about the environment. There was also support for the educational programs provided by the Refuge.

H.3.4.2 Fishing

In general, the comments expressed support for maintaining fishing opportunities on the Refuge. Comments involving access suggested more docks, more shoreline fishing access, easier access to shoreline fishing, and continuation of wading access. Concern was raised that fishing access would be reduced under some of the alternatives through an increase in closed areas and no-wake zones. A reduction of carp in Lake Lowell was requested by a few commenters. The Refuge received comments that both opposed and applauded the proposal of lead-free fishing tackle and barbless hooks. The Refuge also received comments that both requested the continuation of bass tournaments and asked for their removal.

H.3.4.3 Hunting

The Refuge received comments that opposed hunting on the Refuge, as well as comments that were in favor of maintaining or expanding hunting. The comments that opposed hunting on the Refuge cited the safety of nonhunters, disturbance to birds, and a belief that hunting should not be allowed on refuges as some of the reasons for this view. The comments requesting an expansion in the Refuge hunt were variable and included deer hunting, predator hunting, squirrel hunting, and goose hunting at Lake Lowell and turkey hunting on the Snake River Islands Unit.

Comments suggested specific hunting changes, including preventing sky busting and overcrowding, instituting a 25-shell daily limit per hunter, restricting the number of hunters in each access point, restricting waterfowl hunting to three to four days a week on Federal and State-owned waters, reopening of gates if ice thaws before the end of hunting season, and prohibition of electronic calling and decoys on Lake Lowell. And, there were some comments addressing Refuge-proposed hunting changes including not instituting a 25-shell daily limit per hunter and some disagreement over the creation of a permit system. Comments addressed the re-alignment of the hunt areas under the action alternatives (Alternatives 2 to 4). Comments against the re-alignment of the hunt areas stated that there has been no conflict between waterfowl and upland hunters to date, and a reduction in huntable area accessed by shore and re-alignment could increase crowding. If there is a conflict between different types of hunters, as was also stated, it was proposed that it be resolved by separation in time, instead of space. Comments also stated that upland hunting is better on the south side of the lake than in the Eastside Recreation Area.

There were several different ideas concerning deer hunting on the Refuge, including not hunting deer, providing a youth hunt, providing an archery season, hunting deer only if it is necessary for habitat management, and hunting deer to reduce depredation on neighboring lands.

H.3.4.4 Wildlife Observation

Comments discussed the enjoyment that people get from viewing the wildlife and landscapes of the Refuge and requested additional webcams.

H.3.5 Other Recreation

H.3.5.1 Boating

Comments requested that the Refuge continue to have boating and referenced recreational boating as a mode for fishing. There was concern that removing boating could negatively impact the economy of the surrounding area. The comments focusing on additional opportunities included the general request for more boating opportunities as well as the removal of the on-water curfew, the ability to use the canal for nonmotorized boats, and crew training and racing on the lake. Opening rentals for row boats, kayaks, and other nonmotorized watercraft was another idea provided to the Refuge.

H.3.5.2 Motorized Boating

Comments received covered the spectrum from continuing to allow motorized boating with no restrictions to removing all motorized boating from the lake. Some comments suggested that motorized boating should not be changed in any way from the status quo, while others mentioned limitations to boating, including hours of use, motor size, months of use, increased no-wake zone, speed limits, allowing boating in the West Pool only, lake zoning, emissions requirements, shorter boating season, limits on numbers, use of only electric motors, and an enforced decibel level. Some comments voiced the opposite view—they did not want horsepower limits, time restrictions, or seasonal restrictions. Some other ideas that were received in response to the proposed alternatives included a wave elimination device or staggered dike system along the shoreline, limits on speed, smaller no-wake zones, a larger no-wake zone in the East Pool than that in the status quo, seasonal closures only around nesting sites and sensitive areas, permanent no-wake zones adjacent to emergent vegetation, the use of electric motors in sensitive areas, allowing water sports only (no fishing) in the West Pool, reduction or elimination of power boats, allowing nonmotorized boats on the lake year-round, and prohibiting two-stroke motors. It was also suggested that boating as a mode of transportation for sport fishing be managed separately from other types of boating. The elimination of personal water craft, sport boating, motorized boats, and/or large boats from some or all of the lake were also proposed. The Refuge also received comments that thought the wildlife populations and recreational boating current co-exist, while others felt that some motorized boating activities are not compatible with enhancing wildlife. Comments raised the concern that restricting high-speed boating to the West Pool may increase safety issues.

Comments were received that expressed an understanding of the need to protect habitats and wildlife, and reduce negative effects to wildlife-dependent users. Some thought the proposed alternatives met this need, some thought the restrictions on boating did not go far enough, and others thought that the restrictions proposed in Alternative 3 were too drastic.

Some of the questions that were raised included: Is the impact of wakes important when the lake is subject to high wind events and do high-speed boats affect grebes if they are not in or very near the smartweed?

H.3.5.3 Nonmotorized Boating

Comments varied from suggestions to allow only nonmotorized boats on the lake to not allowing anyone but high-speed users in the West Pool. Comments also provided these additional thoughts: increase sailing regattas, nonmotorized vessels have little or no effect on wildlife, open the lake to nonmotorized boating year-round, no-wake zones make nonmotorized use more enjoyable, provide secure canoe racks and a canoe launch, allow nonmotorized craft along the shoreline east of Parking Lot 1 (at least after July 1), allow rowing team races, and allow wind sports from Gotts Point, the Upper Dam boat launch, or Parking Lot 3.

H.3.5.4 Other Non-priority Public Uses

Some comments were received that asked the Refuge to remain a multiuse facility, not to close the Refuge to recreational uses, to reclassify the Refuge as a Recreation Area, to maintain its public uses in their current state, to allow swimming (including expanded swimming areas), dogs, horses, and/or bicycles, to allow new uses like kite flying, trapping, and remote control vehicle access, to allow lake use year-round, and to allow cross-country team practice. Other comments advocated for on-trail only use during nesting season, increased restrictions such as elimination of motors, radios, and cell phones, and the removal/banning of dogs, trapping, and some other uses all together. Some concerns addressed in comments included the economic impacts of any changes, the increased impacts to other reservoirs, lack of water for launching boats in the West Pool, and potential reduction in the ability for families to spend time together. Other comments suggested that proposed changes would negatively impact the local community. Some comments proposed that wildlife and humans are co-existing currently, that a human-made reservoir cannot be a national wildlife refuge, and that user access should be based on money spent in the community. Others thought that since Lake Lowell is part of a national wildlife refuge, it should be managed better for wildlife or only for wildlife and irrigation. Some comments questioned how dogs, bikes, or horses could be more disturbing than motor boats.

Some ideas on how to provide for wildlife, wildlife-dependent recreation, and nonwildlife-dependent recreational uses included implementation of no-wake zones, seasonal closures, partitioning uses, and implementation of a permit based on completion of an environmental education program. The Refuge heard both positive and negative comments about fee implementation.

There seemed to be some confusion over the uses allowed under the action alternatives, as some commenters were concerned that all recreational uses would be removed from Lake Lowell.

H.3.6 Habitat Management

H.3.6.1 Grain Farming

These comments wanted to see wildlife-friendly crops planted on the Refuge. Reasons given were to provide a wildlife food source, provide areas for sportsmen to hunt, and take over areas that are currently weeds. There was a question asked about future crop management and meeting wildlife goals.

H.3.6.2 Off-refuge Issues

Comments suggested that future development around the Refuge be restricted and proposed the use of a buffer zone adjacent to the Refuge's boundary. Concern was voiced over the loss of wildlife feeding habitat adjacent to both units of the Refuge.

H.3.6.3 Predator Management

Comments voiced concern over the predation levels on the Snake River Islands Unit, requested a predator management plan involving public participation, and requested access to the Refuge at night for predator control.

H.3.6.4 Water Issues

Comments showed concern over reduced water quality due to agricultural return flows and gas-powered motors, invasive aquatic species, and the use of herbicides; proposed water quality testing; and discussed the need to improve the water quality of Lake Lowell. There were also comments that showed concern over the preservation of water rights and how water levels, both in Lake Lowell and in the Snake River, affect wildlife.

H.3.6.5 Wildlife/Habitat Management

Comments discussed the need to manage noxious and invasive weeds on both Refuge units. The use of goats, prescribed fire, and cattle were some of the suggestions offered to provide weed control. It was also suggested that desirable nonnative plants be used for management along with native plants.

The comments regarding wildlife and habitat management were varied. They ranged from positive comments about Refuge wildlife to the sentiment that the Refuge has been neglected for several years. Suggestions for habitat management included removal of dead trees and brush, creation of pheasant habitat, planting trees for eventual timber harvest, use of prescribed fire, increasing cattle grazing, wildfire suppression and rehabilitation of burned areas, planting of "wildlife friendly" plants, and keeping Lake Lowell full in the fall. Some comments that were received questioned the amount of impact that uses have had on wildlife and pointed out the need for data collection on many topics.

H.3.7 Refuge Administration

H.3.7.1 Refuge Administration

Comments concerning Refuge administration ranged from positive comments about Refuge management and requests that the Refuge be managed as a wildlife refuge (wildlife first), to comments that pointed out a general lack of management, voiced general opposition to the Federal government, and requested that the Refuge be removed from its ownership. There seemed to be some confusion over current and past ownership of Lake Lowell, with some comments assuming that involvement in the area by the Federal government was a recent occurrence. Some comments wanted to remind the Refuge that the lake was created for irrigation, while others questioned the jurisdiction of the Refuge to manage public uses or mistakenly thought that the lake had a recreation purpose. Other comments pointed out the importance of local research and data collection, requested

additional land acquisition, and questioned where funding would come from for any additional administration.

H.3.8 General Visitor Experience

H.3.8.1 Visitor Experience

These comments expressed visitors' enjoyment of the Refuge because it is a place to recreate close to home and mostly reflected a positive visitor experience.

H.3.8.2 Visitor Facilities

Comments requested more parking, overnight facilities, better maintained bathrooms and dumpsters, better boat ramps, and better facilities for the disabled public. Some comments expressed a positive view of Refuge facilities.

H.3.8.3 Visitor Services

These comments included approval of the visitor center and requests for more welcome and orientation information.

H.3.9 Other

H.3.9.1 Collaboration

These comments focused on partnering with Canyon County, local colleges, and other non-profit organizations to patrol and clean up the Refuge.

H.3.9.2 Law Enforcement

These comments asked for more enforcement of hunting, vandalism, littering, fighting and public drunkenness, underage drinking, and night use laws and regulations. There was also concern raised over the ability to enforce the proposed no-wake zones, permit program for hunting, hunting safety zones, off-leash dogs, and other rules. Hiring additional law enforcement, security patrols, agreements with other law enforcement agencies, and gates that close at dark were suggested as solutions. The question of jurisdiction over fishing regulations and recreational activities was also raised.

H.3.9.3 Miscellaneous

These comments included an overall observation of wildlife and habitat of the Refuge, support for the local mosquito abatement district, and a request to have the lake open one month earlier and close one month later.

H.3.9.4 Public Safety and Health

Comments pointed out concerns over littering, dumping, and *Escherichia coli*; the need for an emergency phone or life guard at the swimming areas; and concerns over interactions with dogs. There were also requests to ban alcohol at the Refuge and to clean up the Refuge to keep fires to a minimum.

H.4 Major Issues

H.4.1 Issues Within the Scope of the CCP/EIS

The following major issues were identified from the comments received. These are not the only issues addressed in the CCP, but represent some of the larger, more complex questions that are examined.

Threats to Refuge Resources: What actions should the Service take to reduce threats to Refuge wildlife and habitats such as human disturbance to wildlife, invasive species, global climate change, and degradation of water quality? Many of these threats are much larger in scope than just the Refuge. They will be addressed at various scales depending on available information and what is most appropriate and relevant to the Refuge.

Habitat Restoration: What wildlife species and habitats should be the focus of Refuge management?

Wildlife: What can be done to reduce disturbance to feeding, nesting, and resting areas used by wildlife?

Research: What kind of surveys and studies will the Refuge need to inform future management?

Public Uses: What uses are compatible and appropriate at Deer Flat National Wildlife Refuge? How can the Refuge provide the best wildlife-dependent recreational opportunities possible without negatively impacting wildlife or Refuge habitat? Which nonwildlife-dependent uses can the Refuge provide without negatively impacting wildlife-dependent users, wildlife, or Refuge habitat? What should the Service do to enhance public enjoyment, understanding, appreciation, and stewardship of Refuge resources? What can the Refuge do to improve the safety and quality of Refuge hunt programs?

Refuge Administration: What partnerships can be formed to increase public awareness of the Refuge, management of public use programs, and management of Refuge habitat and wildlife resources? How can the Refuge provide increased safety for Refuge visitors and enforcement of Refuge regulations? Should the Refuge institute a fee to fund increased facility management, public use programming, and/or law enforcement?

Facilities: What structures and facilities are needed for Refuge administration and to improve public use opportunities, and are there opportunities to remove other structures to enhance habitat conditions?

H.4.2 Issues Outside the Scope of the CCP/EIS

The issues listed below were found to be outside the scope of the CCP/EIS.

Deer Hunting: A new Lake Lowell Unit deer hunt was addressed in a recent environmental assessment (USFWS 2011a) and hunt package. The hunt was approved in September 2012 and began in October 2012. Because impacts of the Lake Lowell deer hunt were so recently assessed, the Lake Lowell deer hunt is outside of the scope of the CCP.

Development: Development that reduces habitat, impacts wildlife, or increases pollution outside of the Refuge borders could impact the wildlife and habitats of the Refuge. The CCP may discuss partnering with local entities to identify areas of concern for future development, but the Refuge will not be attempting to restrict or direct future county or city development within the CCP. Managing development outside the Refuge's boundary is within the management control of city and county governments, not within the management control of the USFWS.

Fisheries Management: Service policy requires us to develop a fisheries management plan. The plan will be developed in close coordination with IDFG.

Lake Lowell water levels: The Refuge received comments expressing concern that using the water in Lake Lowell to meet biological goals and objectives would reduce the amount of water available to local irrigators. 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 executive order that established Deer Flat NWR states the Refuge does not have the legal authority to manipulate water levels.

Reclamation Zone Activities: The Reclamation Zones are located to the west of the Lower Dam and to the north of the Upper Dam. These areas are within the boundary of the Refuge but are legally managed by Reclamation. Management of all activities in these areas is outside the scope of the CCP.

Refuge Boundary: No modifications to the Refuge boundary were considered or are proposed in this Draft CCP/EIS. Individual boundary issues are researched as issues arise.

Restructuring of Priority and Nonpriority Recreational Activities: Because the concept of priority/nonpriority and wildlife-dependent/nonwildlife-dependent activities are found in the National Wildlife Refuge System Administration Act of 1966, as amended, and are a matter of law, making changes to these categories is not within the scope of the CCP.

Snake River boating: The Snake River is considered navigable waters and is not managed by the Service. This issue is not within the jurisdiction of Deer Flat NWR, and therefore it is outside the scope of the CCP.

Snake River Water Flows: Water levels in both the Snake River and Lake Lowell are outside the management control of the USFWS.

Water Quality Control: Although water quality is extremely important to the health of the wildlife and habitats of Deer Flat NWR, many of the forces influencing water quality are not within the management control of the USFWS. Refuge staff may partner with other agencies to create solutions to the water quality problem and assist in implementation of the total maximum daily load plan proposed by the Department of Environmental Quality.

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
Jennifer Brown-Scott	Refuge Manager, Deer Flat NWR	FWS
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Stan Culling	Deputy Refuge Manager, Deer Flat NWR	FWS
Steve Dunn	Natural Resource Specialist, Middle Snake Field Office	Reclamation
Charles Houghten	Division Chief, Division of Planning and Visitor Services, Region 1	FWS
Elaine Johnson	Former Refuge Manager, Deer Flat NWR	FWS
Susan Kain	Visitor Services Manager, Deer Flat NWR	FWS
Carl Mitchell	Former Wildlife Biologist, Southeast Idaho Refuges Complex	FWS
Addison Mohler	Wildlife Biologist, Deer Flat NWR	FWS
Kendra Niemec	Former Deputy Refuge Manager, Deer Flat NWR	FWS
Sharon Selvaggio	Former Planner, Division of Planning and Visitor Services, Region 1	FWS
Amy Wing	Former Planner, Division of Planning and Visitor Services, Region 1	FWS

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.

Name	Title	Organization
Randy Aulbach	Maintenance Worker, Deer Flat NWR	FWS

Name	Title	Organization
Brad Bortner	Supervisory Wildlife Biologist, Migratory Birds and Habitats Programs, Region 1	FWS
Dar Crammond	Former Hydrologist, Water Resources Branch, Region 1	FWS
Daniel Eckstrom	Office Aide, Deer Flat NWR	FWS
Joe Engler	Regional Biologist, Region 1	FWS
Todd Fenzl	Former Zone Law Enforcement Officer	FWS
Robert Flores	Refuge Supervisor, NWRS, Region 1	FWS
Mike Gregg	Wildlife Biologist	FWS
Rich Hannan	Deputy Regional Director, Region 1	FWS
Ben Harrison	Division Chief, Branch of Refuge Biology, Region 1	FWS
Joan Jewett	Public Affairs Specialist, Region 1	FWS
Kay Kier-Haggenjos	Writer-Editor, Region 1	FWS
Kevin Kilbride	Wildlife Biologist, Branch of Refuge Biology, Region 1	FWS
Meggan Laxalt-Mackey	Public Affairs Specialist, Snake River Fish and Wildlife Office	FWS
Barbara Locati	Former Administrative Officer, Deer Flat NWR	FWS
Mike Marxen	Branch Chief, Visitor Services and Communications, Region 1	FWS
Kendra Maty	GIS Specialist, Region 1	FWS
Scott McCarthy	Branch Chief, Division of Planning, Region 1	FWS
Ray Portwood	Zone Law Enforcement Officer	FWS
Chris Reighn	Biologist, Snake River Fish and Wildlife Office	FWS
Robyn Thorson	Regional Director, Region 1	FWS
Nick Valentine	Archaeologist/Museum Specialist, Region 1	FWS
Robin West	Regional Chief, NWRS, Region 1	FWS

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.

Name	Title	Organization
Bob Carter	Urbanization Specialist	Boise Project Board of Control
Vern Case	Director, Riverside Irrigation	Board of Idaho Water Users

Name	Title	Organization
	District and Chairman	Association
Duane Casey	Lake Lowell Water Master	Boise Project Board of Control
David Dahms	Boating Program Manager	Idaho Department of Parks and Recreation
Wendy Davis	Recreation Program Supervisor	Nampa Parks and Recreation
Paul Deveau	Project Manager	Boise Project Board of Control
Jeff Dillon	Regional Fishery Manager	IDFG
Greg Humphreys	Environmental Protection Specialist	Federal Highways Administration
Darrin Johnson	Director	Nampa Parks and Recreation
Ben Keyes	Lieutenant, Marine Patrol Section	Canyon County Sheriff's Office
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
Tim Page	Assistant Project Manager	Boise Project Board of Control
Jake Powell	Wildlife Biologist	IDFG
Scott Reinecker	Southwest Regional Manager	IDFG
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
Jim Budolfson	Retired	Reclamation
Greg Burak	Environmental Staff Biologist	IDFG
Ed Burnett	Director	Canyon County Mosquito Abatement District
A.J. Church	Former Staff	Office of Senator Mike Crapo

Name	Title	Organization
Matt Erickson	Conservation Officer	IDFG
Diane French	Former Biological Technician, Deer Flat NWR	FWS
Bruce Haak	Non-game Wildlife Biologist	IDFG
Dennis Hardy	Recreational Maintenance Foreman	IDFG
David Hopper	Fish and Wildlife Biologist, Snake River Fish and Wildlife Office	FWS
Matt How	Visitor Services and Communication, Region 1	FWS
Steve Humphries	Biologist	Ducks Unlimited
Lyndell Jackson	Former President	Friends of Deer Flat Wildlife Refuge
David Loper	Director, Environmental Health Services	Southwest District Health
Jim Martell	Director	Canyon County Weed and Gopher Control
Jerry Neufeld	Extension Agent	University of Idaho
Lauri Monnot	Watershed Coordinator	IDEQ
Michael Morse	Contaminant Specialist, Snake River Fish and Wildlife Office	FWS
Andy Ogden	Wildlife Habitat Biologist	IDFG
Dan Papp	Former Wildlife Educator	IDFG
Bob Peyton	Assistant Refuge Supervisor, NWRS, Region 1	FWS
Steve Reddy	Extension Agent	University of Idaho
Mike Shipman	Member	Friends of Deer Flat Wildlife Refuge
Amy Ulappa	Former EE Specialist, Deer Flat NWR	FWS
Jim Vannoy	Environmental Health Program Manager	Idaho Department of Health and Welfare
Linda Watters	Former Assistant Refuge Supervisor, NWRS, Region 1	FWS
Lynnette Wilfling	Member	Friends of Deer Flat Wildlife Refuge
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
Jennifer Brown-Scott, Project Leader
Deer Flat National Wildlife Refuge
Date

Reviewed by _____ 2/16/2010
Pam Ensley, Regional Fire Management Coordinator
Pacific Region, U.S. Fish and Wildlife Service
Date

Reviewed by _____ 3/9/2010
Ben Harrison, Division Chief Natural and Cultural Resources
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Date

Reviewed by _____ 2/11/10
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Pacific Region, U.S. Fish and Wildlife Service
Date

Reviewed by _____ 3/11/10
Carolyn Bohan, Assistant Regional Director, Refuges
Pacific Region, U.S. Fish and Wildlife Service
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

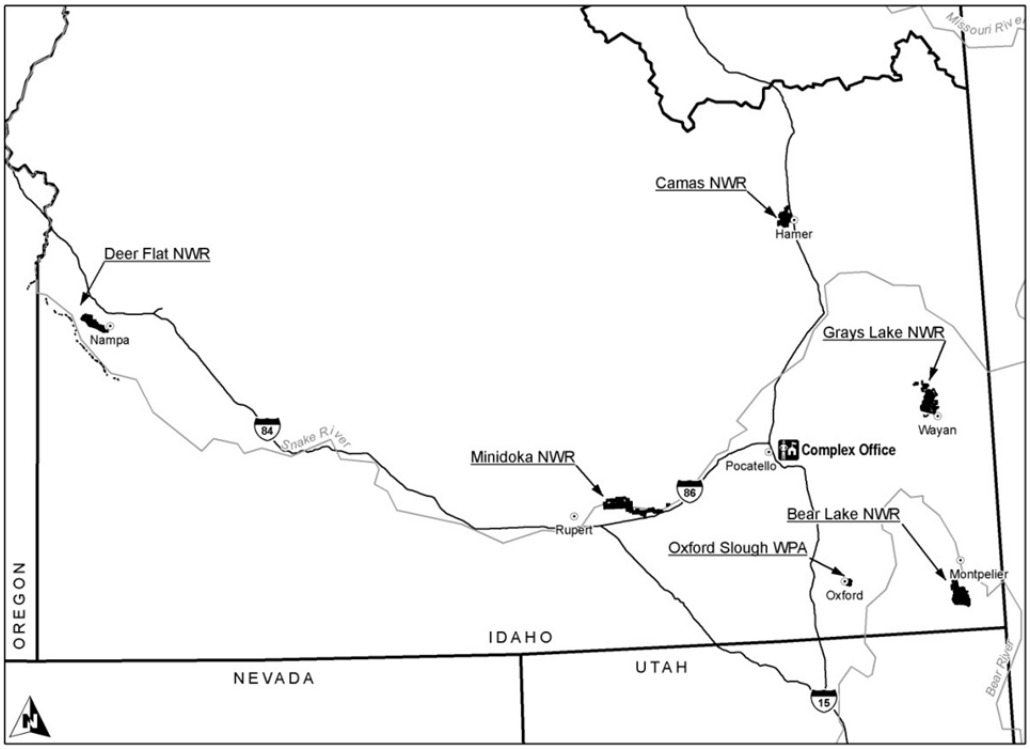
Fuel Model	Rate of Spread (ch/hr)	Flame Length (ft)
1	99-665	4-12
2	34-314	6-18
6	36-207	6-15
8	2-10	1-3
10	10-55	5-13

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 ½ 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.

List of Appendices

Appendix A: Maps
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
Appendix F: Interagency Agreements & Delegations
Appendix G: Initial Attack Fire Size Up
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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.

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 Use Study

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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.

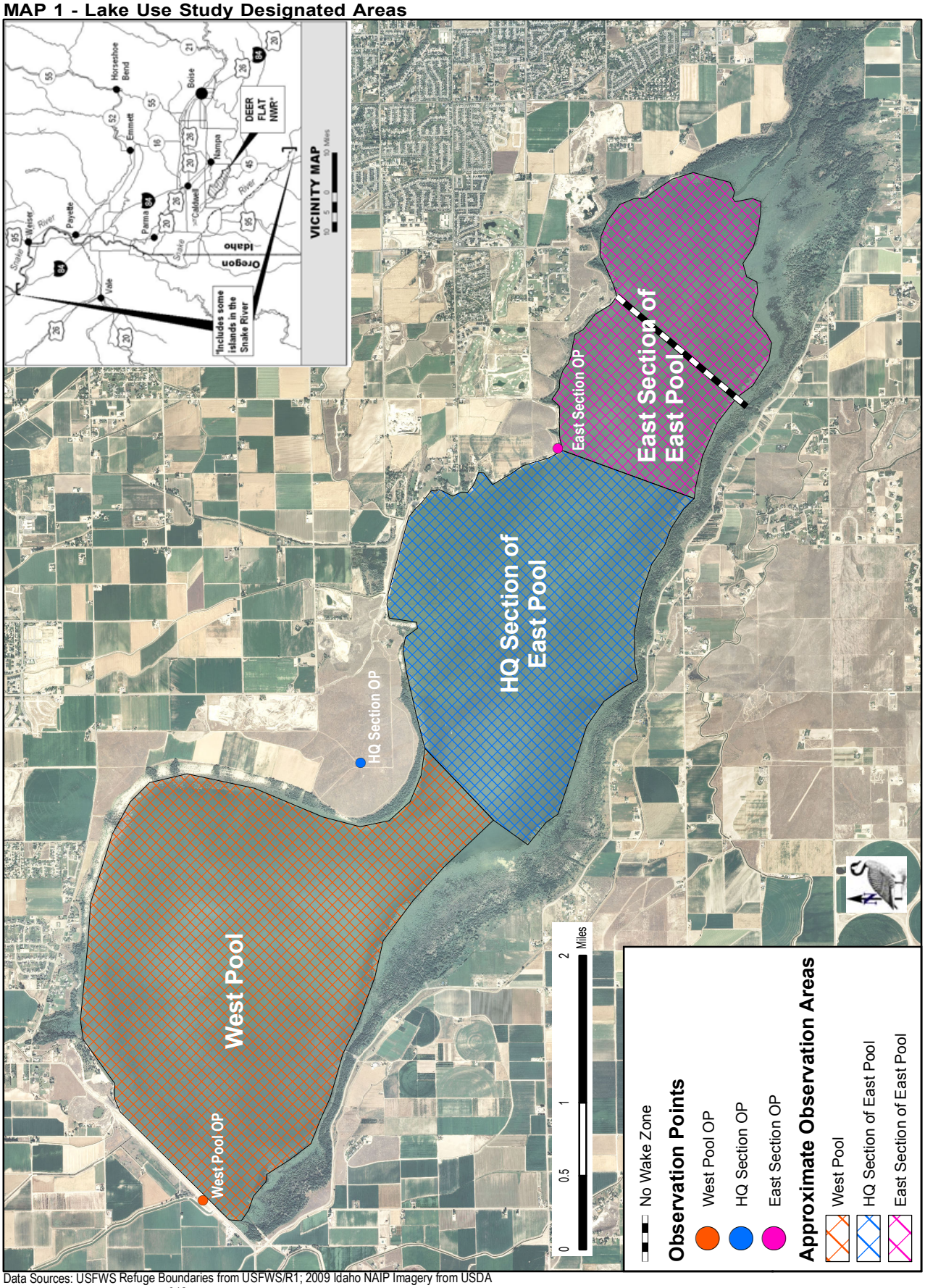
Efforts were made throughout the survey to ensure the quality and consistency of the data collected. Training sessions were conducted at each site prior to study commencement. The training session allowed the observers to gain familiarity with the field data collection sheets, data collection methods, 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

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	45,300	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	$17.9	$28.6
Secondary effects	0	$9.8	$17.3
Total effect	1	$27.6	$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	$50.1	$81.8
Secondary effects	1	$30.4	$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	$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	$17.9	$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	$48.0	$78.5
Secondary effects	1	$29.2	$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	$17.5	$28.2
Secondary effects	0	$10.0	$17.6
Total effect	*1*	*$27.4*	*$45.8*
Hunting (big game, waterfowl, and other migratory birds)			
Direct effects	0	$10.1	$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	$41.1	$72.9
Total effect	*4*	*$118.2*	*$198.7*
Swimming and other beach activities			
Direct effects	3	$84.1	$137.6
Secondary effects	1	$51.1	$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	$42.1	$68.8
Secondary effects	1	$25.6	$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	$13.3	$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	$17.8	$29.2
Secondary effects	0	$10.8	$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	$46.4	$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

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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	45,040	3,390	28,150	2,119
Hunting (big game, waterfowl, and other migratory birds)	6,765	6,224	541	4,371	380
Non-Consumptive (wildlife watching & photography, environmental education, and interpretation)	93,410	84,069	9,341	31,526	3,503
Non-priority uses					
Non-wildlife dependent boating	55,080	47,920	7,160	29,950	4,475
Swimming and other beach activities	60,290	52,452	7,838	26,226	3,919
Land-based non-wildlife dependent (walking, jogging, and other activities (e.g., picnicking)	32,280	28,084	4,196	10,531	1,574
Total Visitation	296,255	263,788	32,467	130,754	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 and 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 vertibrates. 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.

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National Wildlife Refuge System Information
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The mission of the U.S. Fish & Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

Cover Photo:
Mule deer overlooking refuge
Addison Mohler, USFWS