

Appendix E



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Swamp sparrow

Findings of Appropriateness and Compatibility Determinations

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JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Camping

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

Camping is not a priority public use, but a general use. This use does not, as a standalone activity, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detracting from administering priority uses. The refuge does not have the facilities or staff to manage this use. Camping is not consistent with Service policy on secondary uses and would divert existing and future resources from accomplishing priority tasks. It also presents unacceptable levels of risk from the potential spread of campfires to wildfires. This use is also not consistent with any approved refuge management plan. The general use of camping is, therefore, determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercial Fishing and Crabbing

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

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

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

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

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

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

Not Appropriate **Appropriate**

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercial Fishing & Crabbing

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Commercial fishing has occurred in the tidal waterways of Slaughter Canal for over 30 years by a small number of fishermen; however, the refuge has recently enhanced the priority uses of hunting, fishing, wildlife observation and photography. Commercial fishing, which is not a priority public use, is not consistent with goals and objectives in any refuge management plan, conflicts with rod and reel recreational fishermen and wildlife observers using canoes/kayaks, and has the potential to harm non-targeted fisheries through incidental by-catch.

The Service has statutory authority under the National Wildlife Refuge System Administration Act of 1966 (Administration Act) to regulate activities that occur on water bodies within refuge units. In addition, under Delaware law, the rights of property owners extend to natural low water. Therefore, Slaughter Canal, which is an excavated waterway, is owned by the United States as the property owner.

Fishing for bait fish is permitted for recreational uses only, subject to regulations stated in Title 7 (Conservation) of the Delaware State Code. Commercial crabbing is prohibited in refuge waters as stated in Title 7 (§ 2304) of the Delaware State Code.

Commercial fishing and crabbing is considered an economic use of a national wildlife refuge and is guided by the following policies:

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

16USC668dd, 50 CFR, Subpart A, 29.1 Allowing Economic Uses on National Wildlife Refuges

We may only authorize public or private economic use of the natural resources of any national wildlife refuge, in accordance with 16 U.S.C. 715s, where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission.

5 RM 17, Commercial & Economic Uses on National Wildlife Refuges

Due to these reasons, these activities will materially interfere with and detract from the mission of the Refuge System and purposes for which the refuge was established. In addition, these activities will not fulfill one or more purposes of the refuge or the Refuge System. The use of commercial fishing and crabbing is therefore determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Dog Walking

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Dog Walking

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

The refuge has re-examined and evaluated our existing policy on dog walking to better meet the needs of our public while also minimizing wildlife disturbances. Since the refuge mission consists of providing habitats for wintering and migrating birds that include waterfowl, shorebirds, wading birds, marshbirds and landbirds, minimizing those uses that provide the greatest potential conflicts and disturbances to those migratory bird species is a priority. Dogs have been shown by recent research to displace native migratory bird species (Banks & Bryan. 2007; Fernandez-Juricic and Telleria. 2000).

Minimizing negative impacts to other associated wildlife species that also share many of these same habitats is also a responsibility of refuge staff. Research has revealed that dog presence results in definite predator-type defense reactions by native wild mammals, including avoidance/vacating the area (Lima et al.1999; Mitchell & Banks. 2005; Lenth, et al. 2006.)

This determination does not extend to the use of (dog) retrievers by waterfowl hunters and upland game hunters engaged in legal hunting activities on the refuge.

Hunting with a retriever is a much less frequent occurrence than general dog walking, which presumably could occur daily and result in far greater negative impacts to wildlife and habitat. Furthermore, hunting is a priority public use of the National Wildlife Refuge System, and the use of retriever dogs helps to facilitate the use while minimizing potential negative impacts during hunts.

LITERATURE CITED

See CCP Bibliography.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Geocaching and Metal Detecting

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Geocaching and Metal Detecting

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

The geocaching and metal detecting are not priority public uses, but general uses. They do not, as standalone activities, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. Geocaching and metal detecting are not wildlife dependent recreational activities and could potentially impact other refuge management activities on the refuge. Due to the potential historic and cultural resources on the refuge, geocaching and metal detecting could impact the Service’s ability to protect and manage these resources. In addition geocaching and metal detecting do not comply with existing federal regulations. The placement of any object on or the removal of any object from a National Wildlife Refuge violates several federal regulations including but not limited to the following:

16USC668dd, 50 CFR 27.93, Abandonment of Property

Abandoning, discarding, or otherwise leaving any personal property in any national wildlife refuge is prohibited.

16USC668dd, 50 CFR 26.21a, Trespass

No person shall trespass, including but not limited to entering, occupying, using, or being upon, any national wildlife refuge, except as specifically authorized in this subchapter C or in other applicable Federal regulations.

16USC668dd, 50 CFR 27.63, Search for and removal of other valued objects

(a) No person shall search for buried treasure, treasure trove, valuable semiprecious rocks, stones, or mineral specimens on national wildlife refuges unless authorized by permit or by provision of this subchapter C.

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

The refuge does not have the facilities or staff to manage these uses. The general uses of geocaching and metal detecting are, therefore, determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Horseback Riding

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Horseback Riding

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

The horseback riding is not a priority public use, but a general use. This use does not, as a standalone activity, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. The refuge does not have the facilities or staff to manage this use. Horseback Riding is not consistent with Service policy on secondary uses and would divert existing and future resources from accomplishing priority tasks. It also presents unacceptable levels of risk from the potential spread of invasive species from horse droppings and could present conflicts with other refuge users. This use is not consistent with any approved refuge management plan. The general use of horseback riding is, therefore, determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Non-Service Competitive & Non-Competitive Events (weddings, cross country races, volksmarch walks, running events, family reunions, fishing derbies, bicycle races, etc.)

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Non-Service Competitive & Non-Competitive Events (weddings, cross country races, volksmarch walks, running events, family reunions, fishing derbies, bicycling races, etc.)

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.” The non-Service competitive and non-competitive activities are not priority public uses, but are general uses and sometimes economic uses. They do not, as standalone activities, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detracting from administering priority uses.

Events would include but not be limited to cross country races, weddings, volksmarch walks, running events, family reunions, fishing derbies, and bicycle races. These uses are not wildlife dependent recreation uses under the National Wildlife Refuge Improvement Act of 1997. These events on the refuges are not necessary for safe, practical, and effective conduct of existing wildlife-dependent recreational uses. The effects of this use pose a threat to habitat and wildlife resources, and temporarily displace wildlife. Special events do not appreciably contribute to the public’s understanding and appreciation of the refuge’s natural and cultural resources nor is the use beneficial to the refuge’s resources. These uses would also impact other refuge uses which are wildlife dependent recreational uses. The refuge does not have the facilities or staff to manage these uses. These uses are also in violation of several federal regulations including but not limited to the following:

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

16USC668dd, 50 CFR 27.86, Begging

Begging on any national wildlife refuge is prohibited. Soliciting of funds for the support or assistance of any cause or organization is also prohibited unless properly authorized.

16USC668dd, 50 CFR, Subpart A, 29.1 Allowing Economic Uses on National Wildlife Refuges

We may only authorize public or private economic use of the natural resources of any national wildlife refuge, in accordance with 16 U.S.C. 715s, where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission.

These events may also have impacts to the refuge’s natural resources. These events can contribute to short-term disturbances of nesting and wintering birds and other wildlife due to the large number of people in attendance. Increased erosion of trails and other sensitive areas could occur with increased traffic that special events produce as well. Due to these reasons, these activities will materially interfere with and detract from the mission of the Refuge System and purposes for which the refuge was established. In addition, these activities will not fulfill one or more purposes of the refuge or the National Wildlife Refuge System. These general uses and sometimes economic uses are, therefore, determined to be inappropriate on Prime Hook NWR.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Off-Road Bicycling/Mountain Bicycling

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

Off-road bicycling/mountain bicycling is not a priority public use, but a general use. This use does not, as a standalone activity, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. The refuge does not have the facilities or staff to manage this use. Potential impacts include: soil compaction and erosion, trampling and mortality of fragile plant communities, habitat loss/deterioration, a shift in plant communities along trails, wildlife disturbance, and a concern for safety due to excessive speed of cyclists. Off-road bicycling could cause damage to refuge soils and vegetation, as well as unacceptable levels of wildlife disturbance. It is not consistent with Service policy on secondary uses and is not consistent with any approved refuge management plan. The general use of off-road bicycling/mountain bicycling is, therefore, determined to be inappropriate.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Off-Road Vehicles

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

Allowing the use of off-road vehicles on the refuge is not a priority public use, but a general use. This use does not, as a standalone activity, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. The use of off road vehicles is not consistent with two executive orders, E.O. 11644 and E.O. 11989, which require that refuges promote safety, minimize conflicts among users, monitor effects of off –road vehicles use if allowed, and close areas to use of off-road vehicles if they will cause adverse effects on soil, vegetation, wildlife, habitat or cultural or historic resources. Potential impacts include: soil compaction and erosion, trampling and mortality of fragile plant communities, habitat loss/deterioration, a shift in plant communities along trails, wildlife disturbance, and a concern for safety due to excessive speed of off-road vehicle users. This use is not consistent with any approved refuge management plan and would divert existing and future resources from accomplishing priority tasks. We do not believe it would contribute to public appreciation or understanding of refuge resources and we believe it could cause conflicts with priority public uses. The refuge does not have the facilities or staff to manage this use. Therefore, the general use of off-road vehicles is determined to be inappropriate.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Operation of Model Planes and Boats on the Refuge

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

The operation of model planes and boats are not priority public uses, but are general uses. They do not, as standalone activities, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. The refuge does not have the facilities or staff to manage these uses. These uses are not consistent with Service policy on secondary uses and are not consistent with any approved refuge management plan. The general uses of Operation of Model Planes and Boats are, therefore, determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Organized or Facility-supported Picnicking

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Organized or Facility-supported Picnicking

NARRATIVE:

Organized picnicking is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (NWR SIA). Organized picnicking, although permitted in the past, will no longer be allowed on the Refuge for several reasons.

The refuge does not have the infrastructure in place to accommodate for organized picnicking activities. Continuing to allow this use may result in increased soil and vegetation compaction, disturbance to wildlife, and trash and food waste that may attract nuisance species to the area. Although the refuge is prohibiting organized picnicking, this does not preclude visitors from bringing food with them for nutrition or safety while they participate in other appropriate and compatible activities on the refuge such as hiking, backpacking, or wildlife observation.

Finally, organized picnicking was not an activity in which the public expressed interest during our public scoping meetings.

After reevaluating organized picnicking under Service policies, required infrastructure, and demand, this activity will no longer be allowed. Since organized picnics have not been observed on the Refuge, the expectation is that prohibiting this activity will not significantly affect current or future visitors. However, prohibiting organized picnicking may positively impact wildlife and wildlife habitat, if only by reducing the amount of soil compaction, vegetation trampling, and trash and food waste that might occur on and off trails, and the frequency and extent of wildlife disturbance.

The general use of organized or facility-supported picnicking is therefore determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Rollerblading and Ice Skating

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Rollerblading and Ice Skating

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

Rollerblading and ice skating are not priority public uses, but are general uses. They do not, as standalone activities, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. The refuge does not have the facilities or staff to manage these uses. These uses are not consistent with Service policy on secondary uses and are not consistent with any approved refuge management plan. Safety is a major concern with these uses. The general uses of rollerblading and ice skating are, therefore, determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Swimming and Sunbathing

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

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

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

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

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

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

Not Appropriate **Appropriate** _____

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Swimming and Sunbathing

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

Swimming and sunbathing are not priority public uses, but are general uses. They do not, as standalone activities, contribute to the fulfillment of refuge purposes, and would detract from the refuge staff’s responsibilities to protect and manage fish, wildlife, and plants and their habitats, as well as detract from administering priority uses. The refuge does not have the facilities or staff to manage these uses. These uses are not consistent with Service policy on secondary uses and are not consistent with any approved refuge management plan. Safety is also an issue. The general uses of swimming and sunbathing are, therefore, determined to be inappropriate.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Cooperative Farming

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

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

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

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

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

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

Not Appropriate **Appropriate**

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Cooperative Framing

NARRATIVE:

Cooperative farming has taken place on the refuge since its founding, and was utilized by the refuge to meet its wildlife habitat management targets (specifically, its wintering and stopover waterfowl food targets) in an efficient manner. The refuge is a globally important migratory stopover site and wintering area for a number of waterfowl species. Waterfowl are dependent upon availability of both high protein and high-energy foods to get them through the winter in a sufficient body condition such that they may survive, migrate north, and breed the following spring. As native aquatic habitats have declined in quality and quantity over the last 50 years, field foraging species, especially the migratory Canada goose, obtain much of their protein and energy in the fall and winter within upland fields, especially agricultural fields. High protein foods are especially important in the early fall and late winter to support the continued growth of juveniles, to support the winter molt, and to prepare birds for spring migration and subsequent reproduction. High-energy foods (carbohydrates) are essential for waterfowl for maintaining body warmth during the coldest times of the winter. Thus, a variety of forage and grain crops need to be available to migratory geese during the winter months, preferably in close proximity to other feeding and resting areas, such as the refuge's impoundments, moist soil units, and salt marsh habitat.

Historically, cropland management has been largely driven by the wildlife manager's interest in game species, alone. The tradition of providing supplemental feed for waterfowl is deeply ingrained in wildlife management history and the local psyche. Forty plus years ago, the concept of waste corn remaining in fields after harvest was widely depended upon as a tool for providing foods for waterfowl. Today, even though the potential agricultural production of row crops can be high for wildlife, corn and soybeans produced on refuge by farmers result in all the grain being harvested as cooperative's share, and what little waste corn remains more often than not germinates before migratory waterfowl arrive.

The numbers of non-migratory Canada geese that nest and or reside on the refuge, as well as across the flyway, have undergone dramatic population growth and have increased to levels that are increasingly coming into conflict with people and human activities. The Service addressed these concerns through the preparation of a Final Environmental Impact Statement (FEIS), Resident Canada Goose Management, published in November 2005. The reduction and/or elimination of farming on the refuge would further support the strategies to reduce, manage, and control resident Canada goose populations. In 2007, the Final Environmental Impact Statement for Light Goose Management was published and in 2008 the final rule was published. This plan, also known as the Snow Goose Conservation Order, supports the reduction of farming and sanctuary for snow geese on the refuge.

The Delaware Wildlife Action Plan (DNREC, 2005) includes the migratory Canada goose as one of the Species of Greatest Conservation Need in the state of Delaware; however, the refuge furnishes 4,200 acres of impounded wetlands that contribute to this purpose. The refuge cannot meet all life cycle requirements of all migratory birds on its limited acreage. The Delmarva goose population (Canada and snow) averaged 698,266 over the 10 year period from 2001-2010, as recorded by the mid-winter waterfowl inventory. The limited acreage of refuge cropland could not sustain even the local wintering goose population throughout the winter.

Goose hunting on Delmarva is a major recreational and economic industry. Providing habitat for Canada geese provides habitat for snow geese as well. Unfortunately, snow geese are well known for being more destructive of agricultural crops, as well as native marshes.

A number of regional bird conservation plans now cover the mid-Atlantic. Focus areas for habitat acquisition and enhancement for all migratory birds overlap both refuges in Delaware. These plans include:

- Atlantic Coast Joint Venture Waterfowl Implementation Plan
- Partners in Flight Bird Conservation Plan for The Mid-Atlantic Coastal Plain
- North Atlantic Regional Shorebird Plan
- Mid-Atlantic / New England / Maritimes Regional Waterbird Conservation Plan
- New England/Mid-Atlantic Coast BCR Implementation Plan – BCR 30
- Atlantic Coast Joint Venture Strategic Plan

Fragmenting native habitats has contributed to a substantial degree to the decline in many federal trust resources, including numerous species of migratory birds, including but not limited to, waterfowl (DNREC, 2005).

The BCR 30 Plan lists species of concern. We have compiled the species considered “High” and “Highest” on this list, highlighting waterfowl species of interest to the refuge, as well as landbird species that would potentially frequent native Delaware habitats (appendix D. Table A). Forest interior dwelling species (FIDS) are noted. These species are habitat area dependent, requiring large blocks of forest, not agricultural cropland, to meet some, if not all of their lifecycle needs.

The refuge must carefully consider its contribution to the management of trust resources locally and across the larger landscape. Cropland is not limiting within the daily foraging flights of migratory and wintering waterfowl. There is well over one million acres of cropland on the Delmarva Peninsula. In light of the fact that habitat fragmentation caused, in part, by clearing land for agricultural crops (DNREC, 2005) is recognized as a major cause in the decline in many federal trust resource populations, cooperative farming can no longer be justified.

In the future, the refuge may assume use of force account farming, (i.e. a non-economic management activity conducted by refuge staff), on a limited basis, to prepare refuge acreage for habitat restoration. Should cooperative farming be regarded as essential once again in the future, the refuge may revisit this activity and re-evaluate the finding of Appropriateness and Compatibility, as required by 5 RM 17, 6 RM 4, 603 FW 1 , 603 FW 2 and 601 FW 3.

LITERATURE CITED:

See CCP Bibliography.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercial Wildlife and Nature Photography

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

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

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

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

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

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

Not Appropriate ___ **Appropriate** ✓

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercial Wildlife and Nature Photography

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges: environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Commercial photography has the potential to inspire and educate the public about the Refuge System, natural habitats, and wildlife.

Commercial photography is not identified as a priority public use of the National Wildlife Refuge System, is considered an economic use of a national wildlife refuge, and is guided by the following policies:

16USC668dd, 50 CFR 27.71, Motion or Sound Pictures

The taking or filming of any motion or sound pictures on a national wildlife refuge for subsequent commercial use is prohibited except as may be authorized under the provisions of 43 CFR part 5.

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

16USC668dd, 50 CFR 27.86, Begging

Begging on any national wildlife refuge is prohibited. Soliciting of funds for the support or assistance of any cause or organization is also prohibited unless properly authorized.

16USC668dd, 50 CFR, Subpart A, 29.1 Allowing Economic Uses on National Wildlife Refuges

We may only authorize public or private economic use of the natural resources of any national wildlife refuge, in accordance with 16 U.S.C. 715s, where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission.

8 RM 16, Audio Visual Productions

5 RM 17, Commercial & Economic Uses on National Wildlife Refuges

43 CFR Part 5, Making Pictures, Television Productions or Sound Tracks on Certain Areas Under the Jurisdiction of the Department of the Interior

Public Law 106-206, Commercial Filming

This activity will not materially interfere with or detract from the mission of the Refuge System or purposes for which Prime Hook NWR was established. In addition, this activity will fulfill one or more purposes of the refuge or the National Wildlife Refuge System.

COMPATIBILITY DETERMINATION

USE:

Commercial Wildlife and Nature Photography

REFUGE NAME:

Prime Hook National Wildlife Refuge, hereafter referred to as the Refuge, located in Sussex County, Delaware.

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

The use is commercial photography, either still or motion pictures, of wildlife, or nature scenes for conservation uses. This is not a priority public use, but would be contributing to priority public uses.

This use typically involves creating a documentary film, taking still photographs, or recording wildlife sounds that are intended to be or could be sold for income or revenue or traded for goods or services. Commercial recording of natural, historic, or cultural subjects are covered under this Compatibility Determination (CD). This CD does not apply to legitimate news media activities.

Each request for this use will be considered, and if appropriate, will be issued a Special Use Permit by the refuge manager. Each request must be presented in writing with details of who, what, where, when, why, and how the commercial operation will be conducted. Each request will be evaluated on its own merit. The refuge manager will use professional judgment and ensure that the request will have no considerable negative impacts to natural, cultural, or visitor services, does not violate refuge regulations, and contributes to the achievement of the refuge purpose or the Refuge System mission. Special needs will be considered on a case-by-case basis and are subject

to the refuge manager's approval. Any approved Special Use Permit will outline the framework in which the use can be conducted and refuge staff will ensure compliance with the Permit.

Commercial photography is a popular enterprise on the refuge due to the scenic natural habitats and abundant wildlife in the area. The refuge staff anticipates that an increase in commercial photography will occur over the next few years as the refuge gains visibility and areas of natural habitat in the surrounding area decrease.

AVAILABILITY OF RESOURCES:

Permitting this use is within the resources available to administer our Visitor Services Program. Additional staff costs are incurred to review each request, analyze affected habitats and wildlife, coordinate with the outside entity and process a Special Use Permit, if necessary. Compliance with the terms of the Permit is within the regular duties of the Complex's Law Enforcement Officer. Anticipated costs for up to five requests are as follows:

- Refuge Biologist (GS-11) (review request) – 1 day/yr = \$238
- Visitor Services Manager (GS-09) (review requests, coordinate with entity, process SUP) – 3 days/yr. = \$589
- Refuge Manager (GS-12) (review and approval) – 1 day/yr. = \$285
- Law Enforcement Officer (GS-09) (enforcement patrols) 1 day/yr. = \$196
- Administrative Assistant (GS-06) (issue SUP) – 1 day/yr. = \$145

ANTICIPATED IMPACTS OF THE USE:

For a complete analysis of the anticipated impacts of commercial photography, refer to chapter 5 of the CCP/EIS.

Commercial photography can result in positive or negative impacts to the wildlife resource. Visitors engaging in commercial photography are expected to use and stay on hiking and canoe trails or roads to access the interior of the refuge. To minimize disturbance to natural resources and insure public safety, the refuge has implemented restrictions on public entry such as closed areas, seasonally restricted areas, and daily hour restrictions. Facilities most utilized by refuge visitors engaging in commercial photography are roads, parking lots, trails, and boat launching ramps. Maintenance or improvement of these facilities will cause negligible to short-term minor impacts to localized soils and waters and may cause some wildlife disturbances and damage to vegetation.

Commercial wildlife and nature photography is expected to have negligible short-term, long-term or cumulative impacts on the economy of the towns or county in which the refuge lies based on findings regarding socioeconomic impacts (see appendix I in CCP). We would not expect this activity to considerably alter the demographic or economic characteristics of the local community. All proposed refuge actions will neither disproportionately affect any communities nor damage or undermine any businesses or community organizations. No adverse impacts are foreseen to be associated with changes in the community character or demographic composition.

Commercial filming, as with other uses, has the potential to disrupt cultural resources that are located in wetland areas adjacent to upland areas. Refuge visitors may inadvertently or even intentionally damage or disturb known or undiscovered cultural artifacts or historic properties. Impacts are expected to be negligible based on our observations of past visitor impacts from these uses.

A Section 7 evaluation has been conducted as part of this review to address the Delmarva fox squirrel, piping plover, red knot, and the State endangered bald eagle. It was determined that proposed activities would not likely affect the Delmarva fox squirrel. Areas near active bald eagle nests will not be open at any time for commercial photography and, therefore, are not expected to have any negative impacts on bald eagles (U.S. Fish and Wildlife Service 2007).

Commercial photography is expected to have negligible adverse short-term, long-term or cumulative impacts on secretive marsh and waterbirds, and waterfowl. To minimize waterfowl disturbance from this use, the refuge has designated approximately 3,000 acres as waterfowl sanctuaries that will be closed on a seasonal or annual basis.

Negligible adverse short-term, long-term or cumulative impacts on landbirds are expected. All visitors will be required to be on designated walking trails and access routes.

Impacts to fisheries from visitors engaged in commercial photography are expected to be temporary and minor. Use of boats and canoes will cause increased suspension of bottom sediments, which should not adversely affect

biological oxygen demand (BOD) for fisheries resources. Boat motors may also harm submerged or emergent vegetation, which may cause a negligible negative impact to protective cover for fisheries. Accidental introduction of invasive plants, pathogens, or exotic invertebrates attached to boats or canoes is a concern.

Commercial photography is expected to have negligible adverse short-term, long-term or cumulative impacts on mammals. The use was evaluated for its potential to benefit or adversely affect amphibians and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Although most species that occur on the refuge are very common and widespread, there is concern for two species of turtle: eastern box and spotted, and amphibians everywhere are considered to be experiencing a general decline.

Impacts to invertebrates such as butterflies, moths, other insects, and spiders are expected to be negligible. Visitors participating in commercial photography are restricted to designated trail routes and interior roads, which minimizes disturbance to invertebrates.

Opportunities for commercial photography are available via new trails using existing and already maintained trail/road networks off of Slaughter Beach Road, Fowler Beach Road, Prime Hook Road, Deep Branch Road, and Broadkill Road. Using existing roads will minimize impacts to refuge resources. Moderate beneficial impacts are expected. Except as noted below, the refuge is open for this use in the following areas every day from one-half hour before sunrise to one-half hour after sunset. Some areas are seasonally restricted to minimize conflict among user groups and to minimize wildlife disturbance.

- a) Designated beach dunes and overwash areas: Closed from March 1 through September 1.
- b) Western Prime Hook Creek (from old shop ramp to Waples Pond): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February.
- c) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp): Closed every day from September 1 through March 15.
- d) Headquarters Area (includes Turkle & Fleetwood Ponds): Closed only for a maximum of two days for deer hunts.
- e) The northern portion of Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15.
- f) Hiking Trails on Fowler Beach Road, Prime Hook Road, and Slaughter Beach Road and Slaughter Canal: Closed except for Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February.
- g) Roadside pulloffs and water control structures/fishing areas at Petersfield Ditch, Slaughter Canal & Cods Road: Open year round.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the refuge's draft Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*; a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Each request must comply with 43 CFR Part 5, Public Law 106-206 of May 2000, 8 RM 16 (Refuge Manual).

To ensure compatibility with the National Wildlife Refuge System and refuge goals and objectives and to minimize or exclude adverse impacts as described above, the activity should be subject to the following stipulations:

- (1) Only commercial photography in support of conservation, refuge purposes, the National Wildlife Refuge System Mission, and/or for education and interpretive purposes will be permitted.
- (2) Permittee(s), designated representative, and associates will comply with all refuge regulations and conditions of the Special Use Permit as provided by the refuge manager. The Special Use Permit will detail who, what, where, when, why, and how the commercial operation will be conducted.
- (3) The Refuge Manager will consider requests that include special access only if they demonstrate a means to enhance education, appreciation, and/or understanding of the natural resources and the National Wildlife Refuge System.
- (4) Alterations to any vegetation are prohibited.
- (5) Permittee will be required to minimize potential impacts to refuge visitors and natural and/or cultural resources within the refuge.
- (6) Permittee is responsible for acquiring and/or renewing any necessary State and Federal permits prior to beginning or continuing their project.
- (7) The refuge manager or designee can suspend the project, modify conditions, and/or terminate the project that is already permitted and in progress should unacceptable, unforeseen, or unexpected impacts or issues arise or be noted.
- (8) Proper credit should be given to the refuge and the U.S. Fish and Wildlife Service for all commercial filming, including commercial recordings of images and sounds collected on the refuge.
- (9) Permittee will clean up all sites of trash and litter to the satisfaction of the refuge manager.
- (10) Permittee will provide the U.S. Fish and Wildlife Service with at least one free copy of all commercial products generated on the refuge.

The refuge shall also collect any costs incurred as a result of photography activities, including but not limited to administrative and personnel costs. All costs recovered shall be in addition to any use fee. Public Law 106-206 states that fees for commercial photography must be based on several criteria, including:

- The number of days the commercial photography or still photography takes place on federal land.
- The size of the film crew present on federal land.
- The amount and type of equipment present on federal land.

JUSTIFICATION:

Commercial photography has the potential to inspire and educate the public about the Refuge System, natural habitats, and wildlife. Wildlife photography is a priority wildlife-dependent use for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and The National Wildlife Refuge System Administration Act of 1966, as amended by 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, ensuring that they receive enhanced attention during planning and management.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated objectives.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the National Wildlife Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

Commercial photography is considered an economic use of a national wildlife refuge and is guided by the following policies:

16USC668dd, 50 CFR 27.71, Motion or Sound Pictures

The taking or filming of any motion or sound pictures on a national wildlife refuge for subsequent commercial use is prohibited except as may be authorized under the provisions of 43 CFR part 5.

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

16USC668dd, 50 CFR 27.86, Begging

Begging on any national wildlife refuge is prohibited. Soliciting of funds for the support or assistance of any cause or organization is also prohibited unless properly authorized.

16USC668dd, 50 CFR, Subpart A, 29.1 Allowing Economic Uses on National Wildlife Refuges

We may only authorize public or private economic use of the natural resources of any national wildlife refuge, in accordance with 16 U.S.C. 715s, where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission.

8 RM 16, Audio Visual Productions

5 RM 17, Commercial & Economic Uses on National Wildlife Refuges

43 CFR Part 5, Making Pictures, Television Productions or Sound Tracks on Certain Areas Under the Jurisdiction of the Department of the Interior

Public Law 106-206, Commercial Filming

This activity will not materially interfere with or detract from the mission of the Refuge System or purposes for which the refuge was established. In addition, this activity will fulfill one or more purposes of the refuge or Refuge System.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: _____

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercially Guided Wildlife Observation

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

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

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

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

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

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

Not Appropriate ___ **Appropriate** ✓

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercially Guided Wildlife Observation

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges: environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Commercial tour guides provide the public with high-quality, safe, educational, and unique recreational opportunities. These visitor services are a valuable benefit to a segment of the American public that is not comfortable with, or for other reasons, chooses not to participate in unguided tours on the refuge.

Commercially guided tours will help increase public understanding of wildlife's needs and when people value something, they are motivated to action. When people understand the connections between land management and larger resource issues in their lives, they are in a better position to make wise resource decisions.

Commercially guided wildlife observation is not identified as a priority public uses of the National Wildlife Refuge System, is considered an economic use of a national wildlife refuge, and is guided by the following policies:

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

16USC668dd, 50 CFR 27.86, Begging

Begging on any national wildlife refuge is prohibited. Soliciting of funds for the support or assistance of any cause or organization is also prohibited unless properly authorized.

16USC668dd, 50 CFR, Subpart A, 29.1 Allowing Economic Uses on National Wildlife Refuges

We may only authorize public or private economic use of the natural resources of any national wildlife refuge, in accordance with 16 U.S.C. 715s, where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission.

5 RM 17, Commercial & Economic Uses on National Wildlife Refuges

This activity will not materially interfere with or detract from the mission of the Refuge System or purposes for which Prime Hook NWR was established. In addition, this activity will fulfill one or more purposes of the refuge or the National Wildlife Refuge System.

COMPATIBILITY DETERMINATION

USE:

Commercially Guided Wildlife Observation

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) “...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds...” {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) “...incidental fish and wildlife-oriented recreational development” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) “the protection of natural resources” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) “the conservation of endangered or threatened species...” {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The refuge will authorize commercially guided wildlife observation within the refuge, and will regulate such use through the implementation of a commercial wildlife guide management program, including issuance of Special Use Permits with conditions. Commercial means that clients pay a fee for the program and the intent of the permittee is to generate profit. Guiding also includes outfitting operations which may not provide an accompanying guide. Guiding does not include no-fee or not-for-profit guided tours conducted by non-profit groups, schools and colleges, or other agencies. This use is covered under the general wildlife observation compatibility determination.

This use also does not include tour bus or other road-based commercial tours which may stop at refuge-administered overlooks or landings.

This activity provides recreational, and often educational, opportunities for the paying public who desire a successful, quality experience, but who may lack the necessary equipment, skills, or knowledge to observe wildlife or otherwise experience the refuge. Commercial guiding for wildlife or other observation is an existing activity on the refuge, but it has not been consistently administered. This use is not a priority public use, but would be contributing to priority public uses.

(b) Where would the use be conducted?

The use would be conducted within the refuge's 10,132 acres, which lie between Slaughter Beach and the Broadkill River along the southeastern coastline of Delaware. In all four units, viewing areas will be highlighted along State roads (Slaughter Beach Road, Fowler Beach Road, Prime Hook Road, and Broadkill Road) in an interpretive auto tour route, where a visitor can access information about the refuge using advanced technology (radio, compact disc, cell phone, downloadable programming, etc.). Designated areas open for guided wildlife observation are as follows:

Unit I (Slaughter Beach Road to Fowler Beach Road): Wildlife observation and photography are the primary uses at designated areas at Fowler Beach, Slaughter Canal, and along the roadsides of Slaughter Beach Road and Fowler Beach Road. This area includes interpretive signs at Fowler Beach, information kiosks (one at Slaughter Beach and two on Fowler Beach Road), parking areas, and an unimproved boat ramp on Fowler Beach Road. Access to the Slaughter Canal is by boat only. We plan to provide access to existing interior roads and trails on the north side of Fowler Beach Road and south side of Slaughter Beach Road for wildlife observation and photography opportunities. A new parking area will be established on the north side of Fowler Beach Road.

Unit II (Fowler Beach Road to Prime Hook Road): Wildlife observation and photography are the primary uses at Slaughter Creek on Cods Road and roadside pull-offs along Prime Hook Road. The area includes two information kiosks on Prime Hook Road and parking areas. We plan to provide access to an existing interior road on the south side of Fowler Beach for wildlife observation and photography opportunities by adding a wheelchair accessible photography blind near a restored wetland area. Visitors can use the new parking area mentioned in the Unit I description. Access to the north side of Fowler Beach Road will be from the existing interior road and trail network.

Unit III (Prime Hook Road to Broadkill Beach Road): Wildlife observation, photography, environmental education, and interpretation are important uses in this area of the refuge. The majority of the public use infrastructure is located near the refuge headquarters. This area includes 5.1 miles of hiking trails (Blue Goose Trail, Photography Blind Trail, Dike Trail-wheelchair accessible, Black Farm Trail, Pine Grove Trail, and Boardwalk Trail-wheelchair accessible); canoe trail on Prime Hook Creek and the Headquarters Canal Ditch; Turkle and Fleetwood Ponds; Goose & Flaxhole Ponds; Petersfield Ditch; trailhead kiosks; informational kiosks (one in partnership with Delaware Division of Fish and Wildlife on Little Neck Road); highway direction signage; parking areas; restrooms; a photography blind; wheelchair accessible observation platform (Dike Trail); wheelchair accessible fishing pier (Fleetwood Pond); numerous interpretive signs and kiosk maps; Visitor Contact Station containing interpretive displays and various mounted animal species; four refuge boat ramps; roadside pull-offs along Broadkill Beach Road; refuge auditorium; an environmental education pavilion; wildlife observation and photography opportunities through special events, programs, and benches along hiking trails. The areas immediately surrounding the refuge office and associated trails provide opportunities for environmental education. We also participate in off-refuge events in Milton, such as the Horseshoe Crab-Shorebird Festival and the Youth Fishing Event.

We plan to enhance opportunities in this area by extending the trail network near the deer check station to provide additional parking and hiking opportunities; developing new facilities for environmental education and visitor services programs; and providing access to existing interior roads and trails on the south side of Prime Hook Road and near Goose Pond (off Deep Branch Road) for wildlife observation and photography opportunities.

Unit IV (Broadkill Beach Road to Broadkill River): Wildlife observation and photography are the primary uses in this area. This area includes roadside pull-offs along Broadkill Beach Road. We plan to reevaluate the trail and observation platform overlooking Vergie's Pond.

(c) When would the use be conducted?

Except as noted below, the refuge is open for wildlife observation, wildlife photography, environmental education, and environmental interpretation in the following areas every day from open one-half hour before sunrise to one-half hour after sunset. Some areas are seasonally restricted to minimize conflict among user groups and to minimize wildlife disturbance.

- 1) Designated beach dunes and overwash areas (Units I & II): Closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.
- 2) Western Prime Hook Creek (from old shop ramp to Waples Pond) (Unit III): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 3) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp) (Unit III): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 4) Headquarters Area (includes Turkle & Fleetwood Ponds) (Unit III): Closed only for a maximum of two days for deer hunts.
- 5) The northern portion of Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 6) Hiking Trails on Fowler Beach Road (Unit I), Prime Hook Road (Unit III), and Slaughter Beach Road and Slaughter Canal (Unit I): Closed except for Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 7) Roadside pull offs and water control structures/fishing areas at Petersfield Ditch (Unit III), Slaughter Canal (Unit I) & Cods Road (Unit II): Open year round.

(d) How would the use be conducted?

Guided wildlife observation may involve the use of refuge boat ramps to access selected sites or routes. Often guides and clients use the same site, route, or one of several locations selected by the guide. Some guided programs may walk to sites/routes from parking lots or roadsides. Guided wildlife viewing operations have typically used existing refuge or other public observation sites. In addition to the observation activities, guides and clients may use refuge facilities for breaks, lunch, or other activities during the outing, and in accordance with refuge regulations.

The total number of wildlife observation guides and clients on the refuge is not known. A first step in establishing a commercial guiding program on the refuge will be to identify existing guides and outfitting businesses through a review of public records and outreach through news releases and special meetings. Until further information becomes available, the refuge manager will annually permit a maximum of three guides for each of the following uses: 1) commercially guided tours for canoeing/kayaking/boats (use of water trails); 2) commercially guided tours for birding or nature (use of upland trails); and 3) guided tours for continuing education. Each guide will be permitted to schedule three trips per year with a maximum of 25 people per trip. For guided tours for continuing education, more than 25 people may be permitted if they are confined to a bus tour. Organizations whose purpose supports refuge goals and objectives will also be able to use the refuge auditorium for meetings/workshops.

Administration of commercially guided wildlife activities will be conducted in accordance with commercial guide use stipulations (attached) developed to ensure consistency throughout the refuge; provide a safe, quality experience; protect resources; and to ensure compliance with pertinent Refuge System regulations and policies.

The guide use stipulations will address all aspects of the guided wildlife observation program including the number of permits to be issued, guide qualifications, permit cost, and selection methods. Commercial Guide Use Areas will be established based on factors such as refuge ownership, available suitable habitat, other refuge resources and users, and other pertinent issues.

Non-motorized boats enter refuge waters from access points on Slaughter Canal at Fowler Beach Road, at Waples Mill Pond on the Brumbley Family Campground, at the office boat ramp, at the ramp at the old maintenance facility, at suitable sites on Goose and Flaxhole Ponds, and at boat ramps at Turkle and Fleetwood Ponds. Slaughter Canal is tidal (Non-motorized boaters are encouraged to do their canoeing or kayaking within two hour window on either side of high tides for best access.) Tidal information is available on the State Division of Fish and Wildlife's web site.

At Fowler Beach, access for these activities will occur only on refuge owned lands on the sandy part of the beach from the toe of the dunes to the Delaware Bay (mean high water demarcation to mean low water demarcation). One parking lot with a dune crossover provides access to the beach. Access on the dune and adjacent marshes is prohibited.

In addition to published 50CFR regulations and State regulations, refuge-specific regulations also apply for Wildlife Observation & Photography, Environmental Education & Interpretation and are as follows:

- 1) All boats must be off the water at sunset.
- 2) Boat motor restrictions
 - a) 30 horsepower motor restriction on Prime Hook Creek and Slaughter Canal
 - b) Electric motors or manual propulsion only on Turkle & Fleetwood Ponds
 - c) Manual propulsion only on Goose & Flaxhole Ponds
 - d) Air thrust boats and jet skis are not permitted
 - e) A "Slow No Wake" zone of one-half mile has been established on the Headquarters Ditch.
- 3) Areas may be closed on the refuge without warning.
- 4) Visitors must stay on the designated trail routes and areas.
- 5) Except as noted below, the refuge is open for wildlife observation, wildlife photography, environmental education, and environmental interpretation in the following areas everyday from open one-half hour before sunrise to one-half hour after sunset. Some areas are seasonally restricted to minimize conflict among user groups and to minimize wildlife disturbance.
 - a) Designated beach dunes and overwash areas: Closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.
 - b) Western Prime Hook Creek (from old shop ramp to Waples Pond): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - c) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - d) Headquarters Area (includes Turkle & Fleetwood Ponds): Closed only for a maximum of two days for deer hunts.
 - e) The northern portion of Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.

- f) Hiking Trails on Fowler Beach Road, Prime Hook Road, and Slaughter Beach Road and Slaughter Canal: Closed except for Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - g) Roadside pull offs and water control structures/fishing areas at Petersfield Ditch, Slaughter Canal & Cods Road: Open year round.
- 6) Dog walking is not permitted on the refuge.
 - 7) Bicycling is allowed only on roads open to public vehicular traffic.
 - 8) The Visitor Contact Station is open weekdays from 7:30am to 4:00pm and seasonally on weekends.
 - 9) The following activities are prohibited, including, but not limited to: ice skating, camping, roller blading, horseback riding, geocaching/metal detecting, off-road and mountain biking, off-road vehicles including ATVs, picnicking, dog walking, competitions or organized group events (e.g. cross country races), non-competitive organized events (e.g., weddings), operation of model boats and airplanes, swimming and sunbathing, waterskiing, personal watercraft (PWC), air thrust boats, soliciting of funds (per 50CFR 27.97 for Private Operations and per 50CFR 27.86 for Begging), and other activities identified in 50CFR Part 27.
 - 10) All boaters would be required to operate their craft and possess all safety equipment in accordance with Delaware State and U.S. Coast Guard Regulations.
 - 11) Beach access will occur only on refuge owned lands on the sandy part of the beach from the toe of the dunes to the Delaware Bay (mean high water demarcation to mean low water demarcation). One parking lot with a dune crossover provides access to the beach. Access on the dune and adjacent marshes is prohibited.

(e) Why is the use being conducted?

Wildlife observation is a compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wild lands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. Based on apparent existing client demand, a significant number of the public are willing to pay for the additional expertise and local knowledge provided by commercial businesses and guides. The refuge provides excellent populations of watchable wildlife in a wild and scenic setting. It is expected that demand for guided wildlife observation will continue to increase, and with it, the number of interested commercial operators.

AVAILABILITY OF RESOURCES:

This program will increase overall costs of refuge operations, including but not limited to, development and review of policy and procedure, yearly administration of permits (inquiries, screening and selecting applicants, issuing permits), and enforcement of permit conditions. In the short-term, existing staff is adequate if shifts in priorities and assignments are made to accommodate a modest guiding program. However, the size and scope of the guiding program, and the number of permits that will be available, will have to be limited in balance with permit fees received. In the long-term, a comprehensive guiding program, when combined with other new initiatives requiring permits, will require additional administrative and/or other personnel as identified in the Comprehensive Conservation Plan. Existing facilities (launch ramps) and other infrastructure are currently sufficient to accommodate this use.

Permitting this use is within the resources available to administer our Visitor Services Program. Additional staff costs are incurred to review each request, coordinate with the outside entity and process a Special Use Permit, if necessary. Compliance with the terms of the Permit is within the regular duties of the Complex's Law Enforcement Officer. Anticipated costs are as follows:

- Refuge Biologist (GS-11) (review request) – 1 day/yr = \$238
- Visitor Services Manager (GS-09) (review requests, coordinate with entity, process SUP) – 3 days/yr. = \$589
- Refuge Manager (GS-12) (review and approval) – 1 day/yr. = \$285
- Law Enforcement Officer (GS-09) (enforcement patrols) 1 day/yr. = \$196
- Administrative Assistant (GS-06) (issue SUP) – 1 day/yr. = \$145

ANTICIPATED IMPACTS OF THE USE:

For a more detailed analysis of the impacts of commercially guided wildlife observation, refer to chapter 5 of the draft CCP/EIS.

Commercially guided wildlife observation can result in positive or negative impacts to the wildlife resource. A positive effect of allowing visitor's access to the refuge will be the provision of additional wildlife-dependent recreational opportunities and a better appreciation and more complete understanding of the wildlife and habitats associated with Delmarva ecosystems. Each application will be evaluated on its own merit and stipulations will be adapted to individual requests to minimize impacts to vegetation and wildlife and ensure that the use is consistent with goals of the refuge and the Refuge System.

Visitors engaging in commercially guided activities are expected to use and stay on hiking and canoe trails or roads to access the interior of the refuge. Disturbance of refuge resources is the primary concern regarding commercially guided activities for wildlife observation. While field trip routes and observation sites are usually located in areas open to the public, disturbance caused by large groups could be more intense because the number of people, and desire to get close to wildlife, may be greater than what normally occurs during general public activities. This disturbance will displace individual animals to adjacent areas of the refuge. Commercially or recreationally, groups of six or more cyclists or groups of 15 or more pedestrian travelers will require a Special Use Permit.

Facilities most utilized by refuge visitors engaging in commercially guided wildlife observation are roads, parking lots, trails, and boat launching ramps. Maintenance or improvement of these facilities will cause negligible short term impacts to localized soils and waters and may cause some wildlife disturbances and damage to vegetation. Impacts from the construction of expanded facilities for visitor services programs that would accommodate commercially guided activities are expected to be negligible.

Commercially guided wildlife observation is expected to have negligible short-term, long-term or cumulative impacts on the economy of the towns or county in which the refuge lies based on findings of economic activity (see appendix I in CCP). No adverse impacts are foreseen to be associated with changes in the community character or demographic composition.

This activity would result in several minor beneficial impacts on the social communities near the refuge and in the state and region as a whole. In the case of commercial guiding, additional economic benefit would be gained by any local businesses providing guided wildlife observation opportunities.

Commercially guided wildlife observation is expected to have negligible adverse short-term, long-term or cumulative impacts on local or regional air and water quality. Localized increases in emissions from visitor's vehicles or boat motors would be negligible. The use of boats by these visitors has the potential to affect water quality negatively by increasing erosion, stirring up bottom sediments, or introducing pollutants into waterways. We do not expect emissions from vehicles or boat motors to substantially affect the water quality of the region.

Commercially guided wildlife observation is expected to have negligible adverse short-term, long-term or cumulative impacts on soils and vegetation. Negligible disturbance to vegetation will occur during the construction of new parking areas on Fowler Beach Road and on Broadkill Beach Road to facilitate wildlife observation/photography activities because existing interior roads and access routes will be used.

Disturbance factors resulting from public use are always considered for all listed species. The Delmarva fox squirrel and piping plover are listed as endangered by the U.S. Fish and Wildlife Service. Bald eagles, a State endangered species, occurs on the refuge and areas near active nests will not be open at anytime for commercially guided wildlife observation and, therefore, are not expected to have any negative impacts (U.S. Fish and Wildlife Service 2007).

Many of the impacts described for waterfowl, shorebirds, and secretive marsh and waterbirds are similar. Commercially guided wildlife observation is expected to have negligible adverse short-term, long-term or cumulative impacts on waterfowl. To minimize waterfowl disturbance from this use, the refuge has designated

approximately 3,000 acres as waterfowl sanctuaries that will be closed on a seasonal or annual basis. This use is expected to have negligible adverse short-term, long-term or cumulative impacts on secretive marsh and waterbirds, shorebirds, and landbirds. An increase in the number of hiking trails, particularly in or near wetland areas, has the potential to increase disturbance to secretive marsh and waterbirds.

Impacts to fisheries from visitors engaged in commercially guided wildlife observation is expected to be temporary and minor. Use of boats and canoes will cause increased suspension of bottom sediments, which should not adversely affect biological oxygen demand for fisheries resources. Boat motors may also harm submerged or emergent vegetation, which may cause a negligible negative impact to protective cover for fisheries. Accidental introduction of invasive plants, pathogens, or exotic invertebrates attached to boats or canoes is a concern, but the expectation is that impacts will be negligible.

Commercially guided wildlife observation is expected to have negligible adverse short-term, long-term or cumulative impacts on invertebrates and mammals. An increase in indirect impacts to mammals due to proposed expansions such as new trails is also expected. The use was evaluated for its potential to benefit or adversely affect amphibians and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Although most species that occur on the refuge are very common and widespread, there is concern for two species of turtle: eastern box and spotted, and amphibians everywhere are considered to be experiencing a general decline.

Guided tour activities may conflict with other refuge users, including commercial or non-commercial tours that will likely use the same areas as independent wildlife viewers, kayakers and canoeists, and hunters and anglers during open seasons. Unregulated or inadequately regulated commercial guiding operations may adversely affect the safety of other refuge users, the quality of their experience, and the equity of opportunity. The refuge's visitor use programs would be adjusted as needed to eliminate or minimize each conflict and provide quality wildlife-dependent recreational opportunities.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the refuge's draft Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*; a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

See attached stipulations.

JUSTIFICATION:

Allowing commercially guided wildlife observation on the refuge will not materially interfere with the purposes of the refuge or the mission of the Refuge System because:

- 1) Existing federal and state agency oversight and regulation of affected species and habitat is sufficient to ensure healthy populations. Disturbance to fish and wildlife will be local, short-term, and not adversely impact overall populations.
- 2) There are adequate state and federal enforcement officials to enforce state and federal regulations.

- 3) Qualifying standards for commercial operators will help ensure that the public is guided by competent individuals.
- 4) Restricting the number of guides and managing how guided activities are conducted will reduce adverse habitat effects, conflicts between competing guide services, and conflicts between guided operations and other refuge users.
- 5) Designated areas of operation (Guide Use Areas), operating requirements, and other regulation of guided activities will minimize conflicts with other refuge users.
- 6) Administrative (application) and Special Use Permit fees will help off-set costs to administer and provide oversight to this use.
- 7) Regulating and limiting the number of commercial operators as stated in the refuge commercial guide program stipulations will provide a safe, quality experience to individuals who want to enjoy the resources of the refuge. It will also increase opportunities for those who wish to observe wildlife and experience the scenic and wild nature of the refuge, but may lack the required equipment, knowledge, or expertise.

This activity will not materially interfere with or detract from the mission of the Refuge System or purposes for which the refuge was established. In addition, this activity will fulfill one or more purposes of the refuge or the Refuge System.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE:

ATTACHMENT:

Draft Stipulations

Commercial Wildlife Observation Guide Program Stipulations on Prime Hook National Wildlife Refuge

(Also applies to guided tours for continuing education)

The following stipulations apply to the special use permits issued for commercial guided recreational tours. Law enforcement and administrative monitoring of permit holders will continue for compliance with the following conditions, which are incorporated into all permits to minimize impacts on refuge lands and resources:

The refuge manager will designate “Commercial Wildlife Observation Guide Use Areas” on the refuge, based on factors such as refuge ownership, available suitable habitat, other refuge resources and users, and other pertinent issues. This will include all land and water acres within the refuge open to the public. For guided canoeing tours for wildlife observation, three guides will be permitted each year and each guide is allowed to conduct a maximum number of three guided tours per year. The same applies for terrestrial guided tours (for birding, interpretive nature walks, etc.). A maximum number of patrons for any guided trip is 25.

Qualified individuals (see below) may apply to conduct guided tours. If the maximum number of guides exceeds the recommended allowance for the refuge, guides will be selected by random drawing for a Special Use Permit valid for up to one year.

Administrative fee will be \$100, non refundable and is comparable to fees issued by refuges in other regions. This fee is based on the salaries, plus 22 percent overhead, for a GS-13 Refuge Manager (\$37.22 an hour at Step 1) and a GS-6 Administrative Assistant (\$15.88 an hour at Step 1), plus a proportionate share of the average cost to operate the refuge (including construction cost, utilities, maintenance, equipment, vehicles, supplies, travel, and training), which is estimated to approximately \$40.00. The staff is required to determine fair market value and cost recovery, and/or conduct competitive bids.

In addition to the administrative fee, the permit fee will be 5% of gross revenues or \$50, whichever is greater (See Table 1).

Qualified individuals are defined as:

1. Licensed as a commercial guide by the state in which they operate, as applicable and must also be certified by the American Canoeing Association (<http://www.acanet.org/>) or similar certification.
2. Possess a current vessel operator license issued by the U.S. Coast Guard, as applicable. Minimum license shall be Operator Uninspected Passenger Vessel (OUPV). The license shall be valid for the area of operations and type(s) of vessel operated. This license applies to guides transporting patrons.
3. Possess a current CPR and First Aid training certificate issued by a recognized national organization
The permittee must provide a copy of the appropriate documentation of current Red Cross First Aid and CPR certification for all guides.
4. Provide proof of insurance, including minimum coverage for general liability and comprehensive for all operations.
The permittee agrees to hold the U.S. Government harmless from liability for any accident or injury to their clients or employees resulting from the activities the permit authorizes. The permittee must provide adequate, appropriate liability insurance: a Certificate of Insurance with adequate Comprehensive General Liability coverage, the minimum amount of liability being \$300,000 per occurrence. The insurance certificate must name the U.S. Fish and Wildlife Service as additional insured, specify that the service or activity the permit authorizes is covered by the policy, and provide a telephone number for verification.

5. Certified as a “Certified Interpretive Guide” through the National Association for Interpretation (<http://www.interpnet.com>) and certified annually by the refuge manager through an orientation of current refuge news and information.
6. Otherwise required by state law.

Permittee must comply with the conditions previously mentioned and to all other Conditions of the Special Use Permit, including but not limited to the following to ensure compatibility:

- 1) The permittee will not advertise on refuge property or distribute leaflets via the refuge visitor contact station, refuge headquarters, etc. They may distribute leaflets only during the approved programs covered by the permit and only to those participants registered for that program.
- 2) All special use permits will expire on September 30, regardless of the date of issue. The permittee is responsible for accurate record keeping and shall provide the refuge manager with the following information by October 10 of each year:
 - Fee schedule for the year (charge per patron)
 - Number of guided or outfitted trips performed on the refuge
 - Number of individuals guided or outfitted
 - Date of each trip
 - Location of each trip, or general area of activity
 - Individual names and description of duties for all additional staff who assist with a trip on the refuge
- 3) A copy of a valid special use permit must be available for inspection on request by any law enforcement officer or refuge staff member, whenever an activity authorized by the permit is occurring. Storing permits in the glove box of a vehicle is acceptable; however, all guides must be knowledgeable about the permit and its conditions.
- 4) Violation of any special conditions of the permit or of any federal, state, local, or refuge regulations may result in a Notice of Violation (NOV) being issued or the revocation or cancellation of the permit without written or verbal warning. In that case, the permit holder will receive immediate notification by phone with follow-up notification by mail. The permit holders are responsible for the actions of their employees, agents, others working under their special use permit, and their clients.
- 5) Regardless of the reason for the revocation or cancellation of a permit, no refund will be made to the permit holder.
- 6) The refuge will issue permits on a year-to-year basis, and will not reissue them automatically on consecutive years.
- 7) Permit holders will provide all participants with relevant refuge information, including the regulations and conditions of the permit. The refuge will supply information to the permit holder, on request.
- 8) Permittees may be assisted by any number of individuals. These assistants must be named/authorized on the permit issued and possess any of the applicable state and Coast Guard licenses for duties conducted, as applicable. These assistants must also attend the required annual orientation by the refuge.
- 9) All boats must carry standard USCG-approved safety equipment.
- 10) Tours must begin and end during daylight hours only.
- 11) Groups will police their routes for litter, vandalism, etc., and report any problems to the refuge office.
- 12) All vessels and vehicles used in guide operations shall be marked with a guide identifier as required by the refuge.

(Note: Some stipulations may not apply to outfitters who do not accompany clients. Deviations will be noted in individual permits.)

Table 1. Current and Anticipated Commercial Recreational Activities at Prime Hook NWR

Refuge Use	Description	Compatible Use?	Special Use Permit Fee*	Max # Guides	Max # Trips per year	Max # Patrons	Expected Revenue for One Guide	Expected SUP Fee
Commercially Guided Tours for Canoeing or Kayaking	Interpretive guided tours on refuge waterways	Yes	\$100 admin fee + 5% of revenues Or \$50, whichever is greater	3	3 trips per guide outfitter	25 people per trip	\$3,375 per year (based on full schedule of three trips, 25 patrons, & \$45 per person)**	\$168.75 (5% of revenues) + \$100 admin fee = \$268.75
Commercially Guided Tours for Birding or Nature	Interpretive guided birding trips; includes trips by non-profit organizations (e.g. DLITE, Bethany Chamber of Commerce)	Yes	\$100 admin fee + 5% of revenues Or \$50, whichever is greater	3	3 trips per guide outfitter	25 people per trip	\$1,500 per year (based on full schedule of three trips, 25 patrons, & \$20 per person)***	\$75 (5% of revenues) + \$100 admin fee = \$175.00
Guided Tours for Continuing Education	Guided tours with or without fees, but sanctioned as continuing education from a recognized organization (includes bus tours, classes from Sussex Academy of Lifelong Learning, Elder Hostel)	Yes	Waived	Same as above	Same as above	Varies due to nature of tour (may allow more than 25 if confined to bus tour only)	Same as above	\$0
Public Use of Refuge Auditorium	Use of auditorium restricted to organizations for meetings/ workshops whose purpose supports refuge goals & objectives	Yes	Waived	n/a	n/a	40 people maximum	n/a	\$0

*Administrative fee of \$100 is non refundable

**Based on guided eco-tour by canoe at Coastal Kayak in Delaware

***Based on guided birding trips by DLITE & Bethany Chamber of Commerce

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Field Trails for Dogs

This exhibit is not required for wildlife-dependent recreational uses, forms of 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)? Field trials for dogs are prohibited except as may be authorized by special permit (50 CFR 27.91).		✓
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	✓	
(d) Is the use consistent with public safety?	✓	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		✓
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	✓	
(g) Is the use manageable within available budget and staff?	✓	
(h) Will this be manageable in the future within existing resources?	✓	
(i) Does the use contribute to the public’s understanding and appreciation of the refuge’s natural or cultural resources, or is the use beneficial to the refuge’s natural or cultural resources?	✓	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?		✓

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

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

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

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

Not Appropriate ___ **Appropriate** ✓

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Field Trials for Dogs

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six legitimate and appropriate uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management. All other recreational uses are now considered general uses. As noted in the Appropriate Use Policy: “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

Field trials encourage practices and techniques that enhance the tradition and quality of the hunting experience and reduce the incidence of downed but un-retrieved game. Field trials typically involve concentrated numbers of participants and spectators, which have the potential to disturb wildlife and their habitats. Dog field trials are non-wildlife dependent uses. 50 CFR 27.91 states that “the conducting or operation of field trials for dogs on national wildlife refuges is prohibited except as may be authorized by special permit.”

This activity will not materially interfere with or detract from the mission of the Refuge System or purposes for which Prime Hook NWR was established. In addition, this activity will fulfill one or more purposes of the refuge or the National Wildlife Refuge System.

COMPATIBILITY DETERMINATION

USE:

Field Trials for Dogs

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) “...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds...” {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) “...incidental fish and wildlife-oriented recreational development” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) “the protection of natural resources” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) “the conservation of endangered or threatened species...” {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION

The mission of the 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.

DESCRIPTION OF USE:

Field dog trials formally test dogs’ scenting, marking, and retrieving ability in aquatic and upland habitats. Events typically last one to three days, and use dead frozen, live birds, or dummy birds. Live birds are usually certified disease free by a veterinarian. Larger events may involve 85 to 100 dogs, 150 to 200 vehicles, and nearly 200 people.

There is no area on the refuge conducive to this type of activity. Space is limited. This event is not a wildlife-dependent recreational use.

AVAILABILITY OF RESOURCES:

This activity is within the budget and staffing capabilities of the refuge to manage. The use would not require any special facilities or improvement to any existing facilities.

The following is a list of the approximate costs to the refuge required to administer this program:

• Refuge Personnel Costs		
• Administrative Time	(3 days @ 8hrs/day@\$28/hr.)	\$672
• Material Costs		\$0
• Total		\$672

ANTICIPATED IMPACTS OF THE USE:

Depending on the timing of the event, this activity may contribute to short-term disturbances of ground nesting birds and other wildlife. Numerous studies have confirmed that people on foot can cause a variety of disturbance reactions in wildlife, including flushing and displacement (Erwin 1989; Fraser et al. 1985), heart rate increases (MacArthur et al 1982), altered foraging patterns (Burger and Gochfeld 1991), and even, in some cases, diminished reproductive success (Boyle and Samson 1985). Based on this information, it is likely that field dog trials would have similar impacts. These studies and others have shown that the severity of the effects depends upon the distance to the disturbance and its duration, frequency, predictability, and visibility to wildlife (Knight and Cole 1991).

The most likely impact to the refuge resources would be during spring and early summer. Limited impacts to nesting birds could occur as described below, but would be relatively minor because the dog training would be limited to a confined area and would occur only a few days per season.

The presence of dogs may flush incubating birds from nests (Yalden and Yalden 1990), disrupt breeding displays (Baydack 1986), disrupt foraging activity in shorebirds (Hoopes 1993), and disturb roosting activity in ducks (Keller 1991). Despite thousands of years of domestication, dogs still maintain instincts to hunt and chase. Give the appropriate stimulus, those instincts can be triggered. Dogs that are unleashed or not under the control of their owners may disturb or potentially threaten wildlife. In effect, off-leash dogs increase the radius of human recreational influence or disturbance beyond what it would be in the absence of a dog.

Impacts to native vegetation could occur from movement of dogs and people over the landscape. Noxious weeds could be spread to other habitats through additional traffic. The short duration, infrequency, and restricted area of these events could result in minor impacts to resident wildlife but may have long-term impacts such as noxious weed spread and infestation.

The role of dogs in wildlife diseases is poorly understood. However, dogs host endo- and ectoparasites and can contract diseases from, or transmit diseases to wild animals. In addition, dog waste is known to transmit diseases that may threaten the health of some wildlife and other domesticated animals. Domestic dogs can potentially introduce various diseases and transport parasites into wildlife habitats (Sime 1999).

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the Prime Hook draft Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*; a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

n/a

JUSTIFICATION:

Dog training is not listed as one of the six priority wildlife dependent recreational uses under the National Wildlife Refuge System Improvement Act of 1997, as amended. Dog training on the refuge is not necessary for the safe, practical, and effective conduct of existing refuge wildlife-dependent recreational uses. While most waterfowl and upland game hunters do employ dogs, training areas can be found elsewhere. Space is limited on the refuge to conduct this type of activity. The effects of dog training poses a minor threat to habitat and wildlife resources, and temporarily displace wildlife.

Dog training does not appreciably contribute to the public’s understanding and appreciation of the refuge’s natural and cultural resources, nor is the use beneficial to the refuge’s natural or cultural resources.

Based on the analysis above, dog training has a negative impact on refuge habitat, displaces wildlife, and detracts staff and operational resources away from programs that contribute to the conservation and management of wildlife, therefore, this activity will materially interfere with or detract from the mission of the National Wildlife Refuge System or the purpose for which the refuge was established.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE:

LITERATURE CITED:

See CCP Bibliography.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercial Forest Management

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

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

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

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

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

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

Not Appropriate **Appropriate**

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Commercial Forest Management

NARRATIVE:

The use is commercial forest management, to include such actions as commercial timber thinning, salvage, and other silvicultural practices used to improve forest habitat conditions. It is not a priority public use of the National Wildlife Refuge System, under the National Refuge System Administration Act of 1966 {16 U.S.C. 668dd-668ee}, as amended by the National Wildlife Refuge System Improvement Act of 1997.

Commercial forest management allows the refuge the option to maintain and enhance necessary habitat for threatened and endangered species by promoting plant communities beneficial to these species, manage forest stands by manipulating stand composition in order to produce high quality habitats for trust resources, and manipulate forest stands to provide diverse plant successional stages ranging from regeneration to mature timber, which will support a variety of wildlife species. This will include promoting hard mast species and by assuring that adequate den and snag trees remain in the stands. These techniques may include harvesting under proper climatic conditions and placing buffer strips where necessary to protect water quality or other natural resources. Various silvicultural treatments will be used to accomplish these forest management objectives. Silvicultural decisions will be based upon the resources of concern and their habitat requirements as it relates to forest composition and structure. Silvicultural decisions should consider the age and vigor of the existing stands and the availability of desirable reproduction. When harvesting timber, we will be concerned with the promotion of diverse, vigorous stands of timber that benefit trust species. An important factor to consider when making silvicultural decisions is the availability of advanced oak regeneration.

The purpose of the use is to improve and maintain optimal habitat conditions for the endangered Delmarva fox squirrel (DFS) and other forest-dependent species over the long term. The primary goal of active forest management on the refuge will be to enhance and maintain habitat for focal species and associated communities identified in the refuge's CCP. These focal species include DFS, breeding black-and-white warbler, wood thrush, scarlet tanager, whip-poor-will, yellow-throated vireo, Kentucky warbler, migrating landbird species, resident reptiles, amphibians, and invertebrate communities.

Many upland forest habitat patches on the refuge now lack the optimal structure, composition or patch size required by designated focal species. Active forest management should improve and accelerate the development of desirable habitat structure, forest composition, and diversity to maintain and enhance forest ecological integrity. Active forest management actions can also maintain appropriate forest structure, age, and/or size class distribution on the landscape where desired. These actions will ensure that adequate habitat is always available for endangered species, forest interior breeding birds and other forest-dependent species.

Commercial forest management, including when necessary, the use of commercial silvicultural contractors and techniques, will contribute to the purposes, for which the Prime Hook NWR was established, the mission of the Refuge System, the enhancement of biological integrity, diversity, and environmental health, and to facilitate the ability of the refuge to meet its habitat and wildlife management objectives.

COMPATIBILITY DETERMINATION

USE:

Commercial Forest Management

REFUGE NAME:

Prime Hook National Wildlife Refuge

DATE ESTABLISHED:

April 8, 1963

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is commercial forest management, to include such actions as commercial timber thinning, salvage, and other silvicultural practices used to improve forest habitat conditions. The use of commercial operators would constitute an economic use. It is not a priority public use of the National Wildlife Refuge System, under the National Refuge System Administration Act of 1966 {16 U.S.C. 668dd-668ee}, as amended by the National Wildlife Refuge System Improvement Act of 1997.

Forest management allows the refuge to maintain and enhance necessary habitat for threatened and endangered species by promoting plant communities beneficial to these species, manage forest stands by manipulating stand composition in order to produce high quality habitats for trust resources, and manipulate forest stands to provide diverse plant successional stages ranging from regeneration to mature timber, which will support a variety of wildlife species. This will include promoting hard mast species and by assuring that adequate den and snag trees remain in the stands. These techniques may include harvesting under proper climatic conditions and placing buffer strips where necessary to protect water quality or other natural resources. Various silvicultural treatments will be used to accomplish these forest management objectives. Silvicultural decisions will be based upon the resources of concern and their habitat requirements as it relates to forest composition and structure. Silvicultural decisions should consider the age and vigor of the existing stands and the availability of desirable reproduction. When harvesting timber, we will be concerned with the promotion of diverse, vigorous stands of timber which benefit trust species. An important factor to consider when making silvicultural decisions is the availability of advanced oak regeneration.

The purpose of the use is to improve and maintain optimal habitat conditions for the endangered Delmarva fox squirrel (DFS) and other forest-dependent species over the long term. The primary goal of active forest management on the refuge will be to enhance and maintain habitat for focal species and associated communities identified in the refuge's CCP. These focal species include DFS, breeding black-and-white warbler, wood thrush, scarlet tanager, whip-poor-will, yellow-throated vireo, Kentucky warbler, migrating landbird species, resident reptiles, amphibians, and invertebrate communities.

Many upland forest habitat patches on the refuge now lack the optimal structure, composition or patch size required by designated focal species. Active forest management should improve and accelerate the development of desirable habitat structure, forest composition, and diversity to maintain and enhance forest ecological integrity.

Active forest management actions can also maintain appropriate forest structure, age, and/or size class distribution on the landscape where desired. These actions will ensure that adequate habitat is always available for endangered species, forest interior breeding birds and other forest-dependent species.

(b) Where would the use be conducted?

The use would occur in areas requiring improved stand conditions for long-term mixed-hardwood forest health and diversity. These activities will be undertaken to create and enhance habitats for endangered DFS. The habitat requirements needed by priority breeding and migratory forested birds are similar to optimal forest stand conditions prescribed to meet the life history requirements for the DFS. The use will occur in appropriate areas gauged to the DFS habitat suitability model. Model parameters will be used as the baseline for forest habitat prescriptions.

Prescriptions will only be conducted after inventories document current forest composition and condition. Assessments will be conducted by professional foresters and wildlife biologists for all the treatment areas on the refuge. When refuge forest stands have been evaluated, site-specific management objectives will establish target forest conditions and potentially “trigger” treatment actions. Pre-treatment forest assessments will include the following information:

- canopy cover (% of stand)
- basal area
- stocking rate per acre
- vines in overstory (% of area)
- number of large trees (> 35 inch dbh) per acre
- mid-story canopy (% of stand)
- vines in midstory (% of area)
- understory canopy cover (% of area)
- ground cover occupancy
- regeneration of hard mast tree species (oaks & hickories) of inventory plot (% of total)
- number of logs of coarse woody debris per acre
- number DFS “den” trees per 10 acre

(c) When would the use be conducted?

The use would occur at different times of the year at various locations, depending on individual site characteristics, stand conditions, spatial and temporal occupancy of resources of concern. It will also occur at times designed to minimize unwanted impacts on natural resources, e.g., erosion, soil compaction, or disturbance to focal species and resident wildlife. It is estimated that the frequency of entry into a stand would be every 5 to 15 years for reassessing stand conditions.

The use may be triggered when forest inventory data indicates conditions are outside the desired conditions (see table 1). Severe weather and insect outbreaks may also trigger management actions.

Table 1. Mixed hardwood forest community maintenance and enhancement prescriptions

Target Forest Conditions	Condition to Trigger Management Action
>80% canopy cover in the stand	< 80% canopy cover in the stand
Basal area 70 to 90 ft ² / acre (16 to 20 m ² /ha)	Basal areas > 100 ft ² /acres (> 28 m ² / ha)
60% to 80% stocking	> 100% stocking
Vines in overstory on 40%-60% of inventory (cruise) plots	Vines in overstory on < 30% of inventory (cruise) plots
Super-canopy trees on 10% to 20% of inventory (cruise) plots [= 4 to 6 super-canopy trees per acre]	Super-canopy trees < 5% of inventory (cruise) plots
Mid-story canopy cover on 30% to 60% of stand	Mid-story canopy on < 20% of stand
Vines in midstory on 50% to 70% of inventory (cruise) plots	Vines in midstory < 30% plots
Understory canopy cover less 30%	Understory canopy cover > 30% of stand
<30% ground cover occupancy average across inventory (cruise) plots	>30% ground cover occupancy average across inventory (cruise) plots
Regeneration of hard mast tree species (oaks and hickories) on 30% to 50% inventory (cruise) plots	Regeneration of hard mast tree species (oaks and hickories) on < 20% of inventory (cruise) plots
2 to 4 logs/acres that provide coarse woody debris	< 2 logs/acres providing coarse woody debris
4 to 6 cavity trees (snags) > 4 inches dbh/acres	< 4 cavity trees (snags) > 4 inch dbh/acres
1 to 4 large den trees or unsound cull trees per 10 acres	< 1 large den tree or unsound cull tree per 10 acres

(d) How would the use be conducted?

Guidelines for making timber sales are found in the Refuge Manual, sections 5 RM 17 and 6 RM 3, and they will be observed in all timber sales.

Timber stands would be inventoried and current conditions would be monitored and then compared to desirable stand conditions. Forest inventory data would also be used to design appropriate management prescriptions required to meet the habitat objectives of our CCP/HMP. It is anticipated that some site-specific forest management actions would require commercial harvest (Franklin et al 2007) thus improving management of forest habitats over the long term.

All technical specifications for forestry best management practices as described by Delaware Forest Service (2006) would be followed. Best management practice specifications are designated to meet the goals of Delaware’s water quality standards and Federal Clean Water Act.

Collection of appropriate inventory data will help design the best forest management prescriptions that meet the objectives of CCP and HMP. Forest management contracts will use the necessary technical specifications required to insure compliance with the Delaware Forestry Best Management Practices Manual. These specifications, as well as additional refuge specific stipulations, will be incorporated in a special use permit issued to the selected contractor.

Table 2 below lists the forest endangered species and some priority migratory bird species identified as refuge management priorities which are directly linked to the habitat management of mixed hardwood forest communities dominated by oaks.

Table 2. Refuge Priority Focal Forest Species

Focal Species	Some Major Forest Structural Requirements
Delmarva fox squirrel	Both upland and bottomland forest habitats are required. Upland forest should contain a variety of nut-bearing hardwoods and seed-bearing trees; Mature forest stands should also contain closed canopies (>80%) and open understories (Dueser 1988). Understory vegetation comprised of shrubs can decrease habitat quality if shrub crown closure is greater than 30%.
Wood Thrush	Breeding: Mature deciduous or mixed (oak/pine) forest, late successional, mesic forest with a moderately dense shrub canopy, moist-soil, and leaf litter. Trees taller than 50 feet with fairly open canopy. Substrate moisture more important than canopy cover. Probability of occurrence increase with forest patch size to a maximum 500 ha (1,235 acres) but does occur in fragments as small as 25 acres.
Black-and-white warbler	Breeding: Area sensitive species that nests in mature and second growth moist deciduous and mixed hardwood forests. Highly sensitive to forest fragmentation requiring contiguous blocks greater than 740 acres (299 ha).
Scarlet Tanager and Yellow-throated vireo	Breeding: Mature deciduous forest, mixed swamp and floodplain forests and rich moist upland forests; prefers oak trees greater than 9 dbh, with relatively closed canopy and high diversity of shrub layer; minimum forest area needed to sustain viable populations from 40 acres. In Maryland, 50% occurrence is reached in forest patches of 15 ha (37 acres) but 100 ha (250 acres) is suggested optimal patch size.

The approach to forest management will vary among different habitat types in the oak dominated Delmarva coastal plain mixed hardwood forest matrix. Management prescriptions will be based upon the inherent site capability (i.e., soil properties, moisture, hydrology, patch size, and surrounding landscape characteristics) of areas to grow certain tree species. It is anticipated that proactive management through the use of commercial forest management services will help make refuge forested habitats generally more resilient to disease and climate change stressors.

Generalized Forest Management Strategies to meet forest habitat objectives:

- 1) promote stands dominated by early seral stages at the refuge periphery
- 2) improve stands dominated of later seral stages in the refuge interior and along water courses
- 3) in managed stands, promote increased compositional and structural heterogeneity, including large-diameter coarse woody debris and snags
- 4) understand the natural disturbance regime inherent to the forest communities found on the refuge and work within the confines of seral pathways dictated by soil, climate, and hydrology of current refuge forest (~ 775 acres) community types that include
 - Southern red oak/heath forest
 - Mesic coastal plain oak
 - Northern coastal plain basic mesic hardwood forest
 - Mid-Atlantic mesic mixed hardwood forest
 - Successional sweetgum forest
 - Mid-Atlantic coastal plain loblolly
- 5) use techniques that emulate natural ecological disturbances (e.g., single tree mortality for multi-aged stands, stand (cohort) replacement in even-aged stands, etc.
- 6) use commercial and non-commercial forestry mechanical treatments, when and where appropriate

Additional details and more in-depth site-specific strategies will be developed once forest inventory and cruise data become available.

(e) Why is the use being proposed?

The use being proposed would assist in maintaining, enhancing, and creating optimal habitat for focal forest species. The refuge wishes to increase patch sizes, diversify species composition, reduce forest fragmentation, and improve forest health and integrity. Maintaining oak dominance in mixed-hardwood stands of the refuge will require using active management techniques, including but not limited to prescribed fire, thinning, and selective harvest. Oaks and acorns will be the foundation for managing refuge forest ecosystems as acorns are the most important food for DFS and other wildlife.

Performing the use on the Refuge Complex lands would be instrumental in addressing the following Delmarva Fox Squirrel recovery tasks, identified in the Recovery Plan (Moncrief, et al. 1993): (4.1) determine effects of timber management and other land use practices on the DFS; (4.2) develop and refine guidelines for prescriptive habitat management for the DFS; (4.3) develop and implement guidelines for habitat management on public lands occupied by the DFS; and (4.4) monitor the outcome of prescriptive habitat management.

Managing for mast will require using standard silvicultural tools, and a number of other vegetation-manipulation techniques (Vose et al 1999). Successful short-term and long-term management for optimizing mast production will require periodic forest habitat manipulations. General recommendations (Dellinger 1973) to promote mast production includes

- 1) periodic thinning to promote vigorous crowns and rapid growth of mast producers
- 2) managing for a diversity of mast-producing species, with a mixture of oaks consisting of one-third in the white oaks group, and two-thirds in the red oak group
- 3) maintaining 50% to 60% of management units in mast-producing stands

Mast-producing stands include oak species greater than 40 years old, sawtimber-size hardwood types with 50% of the basal area in oak, and any cover type with more than 30 square feet of basal area in oak and sawtimber (McShea & Healy 2002). The use of commercial forest management services would provide the best means to optimize long-term mast production on the refuge.

Thinning of stands via single-tree and group selection cuts to achieve prescription basal areas would accelerate the development of a structurally diverse forest in terms of species, size class, and growth forms (trees, shrubs, vines, and forbs) within a heterogeneous forest canopy. Thinning is also the best method to maintain canopy cover that would optimize the regeneration of shade intolerant tree species (e.g., oaks), to support the needs of refuge priority wildlife that are dependent on hard mast.

AVAILABILITY OF RESOURCES:

The refuge may use other Service personnel, contract the services of a state forester or private consulting forester, or use other federal personnel and partners. Forest habitat management funds are programmed through the Migratory Bird Program. Expense for sales funds, programmed through activity 6800, are used only for actual timber harvest costs, such as salaries, equipment, and supplies. Currently, the refuge does not receive any 6800 monies. There would be no construction of any new facilities or improvements on refuge property for this use.

Refuge staff would assume the management of contract development, forest administration, monitoring and forest resource database development and management. The use is not likely to be annually recurring due to the small acreage of total refuge forested habitats (less than 2,000 acres including bottomland and upland forest or potentially reforested areas). The expectation is that most refuge costs would be incurred for planning and conducting forest management during the years that such services would be used:

<i>Forest inventories Pre-harvest planning Marking Timber</i>	\$5,000	(Professional Forester)
<i>Contract Development & Administration</i>	\$2,500	(Refuge Managers)
<i>Wildlife Inventory, Monitoring, Data Entry, and Analysis</i>	\$5,000	(Refuge Biologist)
<i>Road Maintenance and Site Preparations</i>	\$2,500	(Refuge Maintenance Worker)
Total	\$15,000	

ANTICIPATED IMPACTS OF THE USE:

For a more complete analysis of the impacts of forest management, refer to chapter 5 of the draft CCP/EIS.

The operation of heavy equipment for forest management over refuge roads and through natural habitats could impact soils, cause severe rutting, result in increased site erosion, or degrade near-by wetlands or water resources. All commercial forest management actions that have the potential to cause erosion or degrade water resources will be mitigated by following forestry management procedures required by Delaware's Forestry Erosion and Sedimentation Law (Delaware Code Title 3, Chapter 10, Subchapter VI) by adhering to Delaware's Forestry Best Management Practices Manual (2006).

Use of heavy equipment near rivers, creeks, ditches, ponds, and wetlands can result in increased run-off, sedimentation, and reduced shading of water courses, with concomitant increase in water temperatures. These factors may have detrimental effects on aquatic organisms, including fish, invertebrates, and amphibians. Poorly planned timber harvests can alter surface and ground water hydrology and water storage capacity. Maintaining forested buffers around all creeks, ditches, ponds, and other aquatic resources of concern will minimize impacts on water quality and aquatic resources.

Heavy equipment use required for timber harvesting operations may also result in localized impacts to vegetation and wildlife. Damage or destruction of understory vegetation, including rare plants and unique botanical communities are of concern. The use may also damage the litter layer; coarse woody debris, snags or cavity and den trees important for wildlife. Timber harvesting can also alter the moisture regimes in soil and on the forest floor in ways that affect plant and animals such as state rare plant species, invertebrates, amphibians, and small mammals.

Whole tree harvesting can result in a reduction of downed wood and snags in a forest ecosystem. Skidding operations can cause residual damage to trees remaining in the stand that can result in the introduction of disease and insects into an otherwise healthy forest. Harvesting trees may also leave the remaining trees more susceptible to wind throw or salt spray damage, altering plant and animal communities, facilitating the spread of invasive plants, disturbing wildlife temporarily, or displacing it over the long term.

Impacts will be mitigated by placing seasonal restrictions on harvesting to avoid disturbing wildlife at critical times of the year or damaging trees by making careful layouts of skid trails and conducting pre-harvest surveys to protect resources of concern prior to using mechanical harvesters.

In addition, the use could result in the temporary removal of vegetation. Establishment of weedy or undesirable vegetation would also be a possible impact in regenerating managed stands, whether natural or planted, and would require control through mechanical or chemical means. Direct adverse effects are of short duration as vegetation grows quickly during the growing season.

Selective cuttings would be used for partial removals of trees, usually in uneven-aged stands of hardwoods to promote the growth of desired shade tolerant or intermediate tolerant species. The remaining trees would be able to better receive sufficient light, moisture, and nutrients to grow to optimal size. Part of this method would also be the manipulation of sunlight on the ground to successfully regenerate desired species. This activity would have significant beneficial impacts on the growth and productivity of desired tree species and wildlife. Selection system harvesting would allow a timber stand to retain its forested appearance in the years immediately following harvest. Disadvantages of selective cutting would be slower long-term growth, allowing undesirable species to predominate, allowing undesirable epicormic branching on future crop trees, holding back valuable sun-loving species, and being an easily and frequently abused method.

Another method of forest management is prescribed burning, which is comparatively cheap, causes little soil disturbance, and may enhance the availability of nutrients. However, the chance of fire escape is always a factor; smoke may degrade air quality; if fire is too hot, it may damage soils; and there is often a narrow window when treatments can be applied.

Actions to increase patch sizes with a greater diversity of species composition and structure of existing forest stands, reducing forest fragmentation by reforestation of certain areas, and improving forest health and biological integrity of existing forest stands will have beneficial long-term impacts on focal forest management bird species.

Areas where forest management operations were occurring would be temporarily closed. Only a small proportion of the refuge would be closed at any one time so additional impacts on the public should be minimal.

The sociological aspects of forest management programs are complex, and vary widely across geographic boundaries. In many cases, members of the public see and hear only the negative aspects of forest management and associate forest management programs on refuges, especially the cutting of trees, with wildlife destruction and commercialization of the resource rather than with the objectives of wildlife habitat improvement, improved forest health, and other benefits to the environment. These concerns and issues would be addressed in environmental education and interpretation programs about the refuge's forest management program. Furthermore, forest management activities would have some direct beneficial impact on the socioeconomic environment of the region, as many of these techniques would require the contracted services of private timber companies or equipment companies.

Ultimately, the use of sound forest management techniques, including when necessary, the prudent use of commercial silvicultural contractors may provide the refuge the most cost-effective and safest method to increase the average forest age, size class, and acreage over the long term and expand different age classes represented across the refuge landscape. Habitat connectivity would increase along with riparian buffers around water courses and wetlands. Fragmentation of forest habitats would decrease, and the oak component of the refuge's mixed hardwood matrix would also increase. These are all anticipated desirable outcomes that would support the goals and objectives of the CCP and HMP.

Active forest management on the refuge will support all the goals as written in the CCP, especially Goal #1 (manage maritime habitats), Goal #2 (manage forested habitats), Goal #3 (protect wetland habitats) and Goal #4, manage early successional habitats). However, Goal #2 will reap the greatest benefits. In fact, Goal #2 will depend upon proactive habitat management actions in the form of commercial forest management. Proactive forest management will achieve refuge habitat objectives in a more efficient, suitable, and timely manner compared to relying on natural succession processes alone.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning for the refuge, this compatibility determination will undergo public review, including a comment period of 60 days following the release of the draft CCP/EIS.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Guidelines for making timber sales are found in the Refuge Manual, sections 5 RM 17 and 6 RM 3, and they will be observed in all timber sales.

An active refuge forest management program will be created based on sound silvicultural practices using an ecological forestry approach (Franklin et al 2007) to maintain, improve, and enhance refuge forested habitat.

Those contracted by the refuge will be required to follow the best management practices for timber harvest by the state of Delaware (Delaware Forest Service 2006).

The refuge will conduct forest inventories to establish the need for forest management on a specific tract or area within a tract.

The refuge will file for an Erosion and Sediment Control Harvest Permit with the Delaware Forest Service and have the state forester review our pre-harvest plan for concurrence with all commercial forest management actions.

Forest prescriptions will attempt to restore or mimic natural regimes and processes to achieve habitat objectives by recreating and /or maintaining desired forest conditions. Practices will focus on improving forest health, increasing tree growth and vigor, reducing stress, increasing mast production, promoting desirable species composition and facilitating the natural regeneration of desirable tree species throughout the refuge on appropriate sites.

Desired future conditions of the refuge's forests will be managed to enhance ecological and structural diversity where feasible and prudent by using a variety of silvicultural techniques and by retaining a diversity of vegetation and unique structural features.

Snags, live cavity and den trees, and large coarse woody debris (CWD) will be retained, as appropriate, to meet refuge objectives. During any silvicultural treatment, neither DFS den trees nor adjacent trees should be cut. The foliage of adjacent trees shades the bole of the den tree, thus keeping the den cooler. In order to promote additional den sites, trees interfering with crop tree crown development should not be felled but rather left standing and killed by girdling or by using systemic herbicides.

At the discretion of the refuge manager, the creation of snags, live cavity trees and/or CWD, or the removal of individual trees or groups of trees may occur on any areas of the refuge for specific wildlife management reasons or for public safety purposes.

Site specific timber harvesting will occur at times that are seasonally appropriate for each individual site, minimizing impacts on wildlife, e.g., no timber harvest during the bald eagle, or heron nesting seasons.

Where appropriate, the refuge will require contractors to leave tops, branches, and other wood debris on site.

Adaptive resource management will be used in assessing and modifying prescriptions to achieve wildlife habitat objectives in the most efficient and timely manner to expedite the achievement of desirable outcomes.

A pre-entry conference between the refuge forester and the designated permittee representative will be a requirement before the purchaser starts logging operations. The purpose of the pre-entry conference is to ensure that the purchaser completely understands what is expected and thus avoid misunderstanding or serious conflicts.

If requested, satisfactory scale tickets for timber products shall be submitted to the refuge.

Hardwood species will be cut so as to leave a stump not more than 12 inches high for saw timber. All stump heights are measured adjacent to the highest ground. In the case of swell-butt species or trees with metal objects in the butt, stumps may be higher.

Skidding is permitted only where designated on the sale map. The skidding of hardwood logs over 32 feet long may be prohibited in designated areas. Unnecessary damage to the residual stand will not be tolerated. The penalty for excessive skidding or other damage to residual trees will be assessed at \$5.00 per inch dbh.

Ground level paint spot must remain visible after the tree has been cut. The logger may be required to cut and/or remove all marked trees.

Trees and tops shall not be left hanging or supported by any other tree and shall be pulled down immediately after felling.

Tops and logging debris shall be pulled back 20 feet from public roads and lopped within 150 feet of public roads.

All roads, rights-of-way, fields, openings, streams, and firebreaks must be kept clear of tops and debris. Permittee shall also repair all damage to same resulting from operations conducted under this permit.

No unmarked trees will be cut. Penalties will be assessed for cutting unmarked trees at \$5.00 per inch of stump diameter up to 22 inches and \$10.00 per inch of stump diameter for 22 inch and larger stumps.

Any of the penalties imposed will be charged against the performance deposit.

Loading of forest products on a public road, road shoulder, or afforestation area is prohibited.

Ownership of all products remaining on a sale area will revert to the Government upon termination of the permit.

The refuge staff shall have authority to temporarily close down all or any part of the operation during a period of high fire danger, wet ground conditions, or for any other reason deemed necessary. An equal amount of additional time will be granted to the permittee.

The Government accepts no responsibility to provide right-of way over private lands for materials sold under this contract.

The permittee and his employees will do all within their power to prevent and suppress forest fires.

The decision of the refuge manager shall be final in the interpretation of the regulations and provisions governing the sale, cutting, and removal of the timber covered by this permit.

When a timber sale area is adjacent to private land, all logging debris will be pulled back onto the refuge keeping damage to private property at a minimum.

JUSTIFICATION:

Forest management, including when necessary, the use of commercial silvicultural contractors and techniques, will contribute to the purposes, for which the refuge was established, the mission of the Refuge System, the enhancement of biological integrity, diversity, and environmental health, and to facilitate the ability of the refuge to meet its habitat and wildlife management objectives.

The use will not pose any significant adverse effects on refuge natural resources, interfere with the public use of the refuge, or cause an undue administrative burden. Commercial forest management on the refuge will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established as evidenced by the environmental assessment that shows this use will improve and advance our ability to achieve the goals and objectives set forth under the CCP.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE:

LITERATURE CITED:

See CCP Bibliography.

FINDING OF APPROPRIATENESS OF A REFUGE USE

**603 FW 1
Exhibit 1**

Refuge Name: Prime Hook National Wildlife Refuge

Use: Research by Non-Service Personnel. **Certain common research activities are explicitly covered under this determination. We reserve the right to make appropriateness findings for any specialized Research Project by Non-Service Personnel request on a case-by-case basis.**

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

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

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

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

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

Based on an overall **generalized** assessment factors to **conduct Research by Non-Service Personnel**, my summary conclusion is that the described **generalized 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.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Research by Non-Service Personnel

NARRATIVE:

Research conducted by non-Service personnel is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997. This use is not a priority public use of the Refuge System. However, research by non-Service personnel is often conducted by colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the general public. Research on Prime Hook NWR would further the understanding of the natural environment and could be applied to management of the refuge's wildlife.

The refuge reserves the right at any time to find a specific request for a research project by non-Service personnel to be inappropriate or incompatible with the refuge's purposes, Service mission or the refuge's conservation management goals and objective established in the CCP and any stepped down management plan, based on each individual review and assessment of each project's research details.

Not all research may be appropriate. Some research may affect fish, wildlife, and plants in a manner neither consistent with refuge management plans nor compatible with refuge purposes or the Refuge System mission. Some research may interfere with or preclude refuge management activities, appropriate and compatible public uses, or other research. Some research may be appropriate off the refuge, but not on the refuge. For example, some natural and physical research may not be wildlife-dependent and may be accomplished successfully at locations off the refuge. Because not all research supports the establishing purposes of refuges or the Refuge System mission, we cannot define research as a refuge management activity. Therefore, we must evaluate each research proposal independently and may deny a request for a special use permit because we find the proposal to be inappropriate or incompatible.

Certain common research activities are evaluated explicitly in the Compatibility Determination. Any request for research would require issuance of a Special Use Permit issued by the Service. At the time of request, a determination will be made by refuge staff whether the research benefits the understanding of the natural environment and will contribute useful information to the Service and National Wildlife Refuge System. The entire refuge may be open and available for scientific research. An individual research project is usually limited to a particular habitat type, plant or wildlife species. On occasion research projects will encompass an assemblage of habitat types, plants or wildlife. The research location will be limited to those areas of the refuge that are absolutely necessary to conduct of the research project.

The timing of the research will depend entirely on the individual research projects approved design. Scientific research would be allowed to occur on the refuge throughout the year. An individual research project could be short term in design, requiring one or two visits over the course of a few days. Other research projects could be multiple year studies that require daily visits to the study site. The timing of each individual research project will be limited to the minimum required to complete the project. Certain common research activities are described explicitly in the Compatibility Determination.

The methods of the research will depend entirely on the individual research project that is conducted. The methods of each research project will be scrutinized well before it will be allowed to occur on the refuge. No research project will be allowed to occur if it does not have an approved scientific method, causes considerable negative impacts on wildlife and habitat, or compromises public health and safety. Certain common research activities are described explicitly in the Compatibility Determination.

No additional equipment, facilities, or improvements will be necessary to allow research by non-Service personnel. Staff time would be required to review research proposals and oversee permitted projects. We expect that conducting these activities will require less than one-tenth of a work-year for one staff member.

Non-Service organizations and personnel conducting research on the refuge will provide the Service with all data collected and/or reports. The research organization/agency or personnel in conjunction with the Service will retain the use and ownership of all data/reports.

The Service encourages approved research to further the understanding of the natural resources. Research by other than Service personnel adds greatly to the information base for refuge managers to make proper decisions. Disturbance to wildlife and vegetation by researchers could occur through observation, sampling, or accessing the study area. It is possible that direct mortality could result as a by-product of research activities.

Negligible impacts will occur when research projects which are previously approved are carried out according to the stipulations stated in the Special Use Permit issued for each project. Overall, however, allowing well designed and properly reviewed research to be conducted by non-Service personnel is likely to have very little impact on refuge wildlife populations. If the research project is conducted with professionalism and integrity, potential adverse impacts are likely to be outweighed by the knowledge gained about an entire species, habitat or public use.

COMPATIBILITY DETERMINATION

USE:

Research by Non-Service Personnel

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) “...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds...” {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) “...incidental fish and wildlife-oriented recreational development” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) “the protection of natural resources” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) “the conservation of endangered or threatened species...” {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a wildlife-dependent use?

The use is research or other ecological or cultural investigations not conducted by the U.S. Fish and Wildlife Service (Service) or a Service-authorized agent. Research is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

In accordance with 16 U.S.C. 668dd(d) and 50 C.F.R. Part 25, Subpart D, the refuge manager is responsible for reviewing applications for SUPs and determining whether to authorize a proposed use. Uses must be “appropriate,” and if so, also found to be “compatible” with the refuge purposes, and those of the System, prior to be approved and undertaken. These decisions are based on the Service’s best professional judgment, consistent

with Service regulations and policy, including the Policy on Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System (66 Fed. Reg. 3810 (2001); 601 FW 3).

Research is conducted by federal, state, and private entities, including the U.S. Geological Survey, state departments of natural resources, students and professors at state and private universities, and independent non-government researchers and contractors. This activity would allow permitted researchers access to the refuge's natural environment to conduct both short-term and long-term research projects.

The refuge issues from ten to twenty Special Use Permits (SUP) per year allowing research studies investigating biological, physical, and/or social issues and concerns to address refuge management information needs, or enhance understanding of trust resources. Specifically covered under this Compatibility Determination (CD) are the following research endeavors:

- Volunteer-based bird surveys, such as the Christmas Bird Count and Delaware Bird Atlas Project
- Migratory Bird Banding
- Anuran Surveys, such as conducted by DNREC or academic institutions
- Upland or wetland bird surveys
- Delmarva fox squirrel research and monitoring, such as conducted by DNREC
- Coastal Wetland Research, such as conducted by DNREC or academic institutions

Additional research permit requests will be considered on a case-by-case basis, as staff availability dictate, the value of the proposed research warrant, and the professional judgment of the refuge manager. The results of research should result in better knowledge of our natural resources and improve methods to manage, monitor, and protect the refuge's biological resources and public uses.

The refuge manager will always have the discretion to reevaluate the appropriateness and compatibility of any specific 'research by non-Service personnel' request at any time [603 FW 2.1 H(1), (2)]. A specific research project denial will be based on the refuge manager exercising sound professional judgment based on field experiences, knowledge of the refuge's natural resources, particularly its biological resources and available scientific information. When a refuge manager is exercising sound professional judgment, the refuge manager will use available information that may include consulting with others both inside and outside the Service.

When assessing the compatibility of a research project the refuge manager will use sound professional judgment to determine if the details of the project will materially interfere with or detract from the fulfillment of the System mission or purposes of the refuge. Inherent in fulfilling the System mission is not degrading the biological diversity, integrity or environmental health of the refuge.

Rationale for denials in appropriateness or compatibility will be consistent with the principles of sound fish and wildlife management, refuge administration and applicable laws. When a refuge manager is exercising sound professional judgment, and finds a specific research project to be inappropriate or incompatible, such a denial will be based on evidence that the details of a particular research project might lead to the impairment of our conservation mission, or detracts from fulfilling the refuge's purposes, or conflicts with the conservation goals or objectives in an approved refuge management plans, or is not manageable with the available budget or staff time, or is inconsistent with public safety, or conflicts with maintaining or restoring the biological integrity, diversity, and environmental health of the refuge's habitats involved in the research project.

The refuge manager will specify in writing the rationale, conclusions and decision when denying a specific research project request.

(b) Where would this use be conducted?

Sites for this use would be dependent on the particular study being conducted and could occur in a variety of habitat types. Access would be restricted by Special Use Permit to only the study sites needed to meet the objectives of the research.

Volunteer-based bird surveys such as the Christmas Bird Count and Delaware Breeding Bird Atlas are conducted in all habitats of the refuge, and often in areas otherwise closed to the public. Migratory bird banding is most often conducted in refuge wetlands, but may also be conducted in upland habitats such as forests or early

successional fields. Similarly, anuran surveys are most often conducted in wetlands, although the researcher may make observations from an upland location. Upland bird surveys would be conducted in any upland refuge habitat. Delmarva fox squirrel monitoring takes place in refuge forests. Wetland bird surveys and other wetland research may take place in refuge wetlands, whether salt marsh or impounded wetlands, or along the refuge shoreline.

(c) When would the use be conducted?

The timing of research will be dependent on the type and subject(s) of the research project. Research could potentially occur throughout the year. Time of year restrictions could be imposed to protect threatened or endangered species or to prevent conflicts with other refuge uses or management activities.

Certain volunteer-based bird surveys focus on specific seasons in the avian life cycle. For example the Christmas Bird Count is conducted during the winter, and the Delaware Breeding Bird Atlas is conducted during the spring and summer breeding season. Migratory bird banding may be conducted during the breeding or migration seasons, but also less frequently during the winter. Anuran surveys are most often conducted in the spring and early summer. Upland bird surveys would primarily be conducted in the spring and summer, whereas wetland bird surveys may also be conducted during migration and wintering periods as well. Delmarva fox squirrel research may be conducted at any time of the year, depending on specific monitoring objectives for a given survey. Wetland research may take place year-round.

(d) How would this use be conducted?

The mechanics of the research will depend entirely on the individual research project. Each research proposal will be carefully scrutinized for clear objectives, methods, and research approach before allowing it on the refuge. Research proposals that lack an approved study plan and protocol or compromises public health and safety will not be allowed. Draft proposals will be routed through the Regional Research Coordinator and Regional Biologist for review to ensure that protocols meet Service standards.

Any research study sites, sampling locations and transects can be temporarily marked by high visibility wooden or metal posts and must be removed when research ceases. Access to study sites is by foot, truck, vehicle, boat or canoe. Vehicle use is allowed on refuge roads, trails and parking lots normally open to the public or otherwise identified in a Special Use Permit (SUP).

Volunteer-based bird surveys such as the Christmas Bird Count and Delaware Breeding Bird Atlas, as well as other upland and wetland bird surveys, are conducted via field observations of birds during the season of interest. Migratory bird banding is conducted by trained and certified researchers, utilizing appropriate mist nets or other trapping devices. Birds are handled promptly and released. Anuran surveys are conducted via field observations. Delmarva fox squirrel research may include either carefully monitored trap-and-release efforts, or passive photo monitoring. Wetland research will involve several potential techniques. In-field measurements for vegetation and other physical characteristics will be taken. This may include the maintenance of permanent sampling equipment in the field, such as marking posts and surface elevation benchmarks. Some samples of sediments, water, and/or vegetation may be collected and removed from the wetland for further analysis (e.g., benthic core samples or water grab samples).

(e) Why is the use being proposed?

Research by non-Service personnel conducted by colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public furthers our understanding of the natural environment and improves the management of refuge natural resources. Much of the information research generated applies to management on and near the refuge, or supports the understanding and conservation of trust resource species.

The specific research activities described above represent common or recurring research projects that have been determined to have specific benefits for refuge resource decisions, and are conducted by organizations or individuals with appropriate qualifications.

The Service encourages and supports research and management studies on refuge lands that will improve and strengthen decisions on managing natural resources. The refuge manager encourages and seeks research that clearly relates to approved refuge objectives, improves habitat management, and promotes adaptive

management. Priority research addresses information on better managing the Nation's biological resources that generally are important to agencies of the Department of Interior, the National Wildlife Refuge System, and State Wildlife Agencies, that address important management issues, or demonstrate techniques for managing species or habitats.

Consideration may also be given to research for other purposes that may not relate directly to refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation or management of native populations of fish, wildlife and plants, and their natural diversity in the region or the Atlantic flyway. All proposals must comply with Service policy on compatibility.

Both the Refuge Manual and the Service Manual provide guidance on allowing research on refuges. The Refuge Manual (4 RM 6.2) lists three objectives that can be met by permitting research on refuges:

- 1) Promoting new information which will improve the quality of the refuge and other Service management decisions.
- 2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management and the environment in general.
- 3) To provide the opportunity for students and others to learn the principles of field research.

The Service Manual (603 FW 1.10D (4)) provides supplemental guidance in terms of the appropriateness of research on refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research."

The rationale for this conclusion is clearly stated in the preamble to that policy (71 Federal Regulation 36415):

Not all research may be appropriate. Some research may affect fish, wildlife, and plants in a manner neither consistent with refuge management plans nor compatible with refuge purposes or the Refuge System mission. Some research may interfere with or preclude refuge management activities, appropriate off the refuge, appropriate and compatible public uses, or other research. Some research may be appropriate off the refuge, but not on the refuge. For example, some natural and physical research may not be wildlife-dependent and may be accomplished successfully at locations off the refuge. Because not all research support establishing purposes of refuges or the Refuge System mission, we cannot define research as a refuge management activity.

AVAILABILITY OF RESOURCES:

Refuge support for research may take the form of funding, in-kind services such as housing, the use of other refuge facilities, vehicles, boats, or equipment, the direct assistance of refuge staff in collecting data, providing historical records, conducting management treatments, or providing other assistance as appropriate. Generally, however, the bulk of the costs are incurred in staff time to review research proposals, coordinate with researchers, and write SUPs. In some cases, a research project may require only a few hours of staff time to review the proposal, coordinate with other reviewers, and write a SUP. In other cases, a research project may involve more significant staff time, because the refuge staff must coordinate with students and advisors and accompany researchers on site visits.

For projects conducted entirely by non-Service researchers, the following staff resources would be typical:

Proposal review, coordination, and SUP preparation –	Refuge Manager, 2 hours	\$112
	Refuge Biologist, 8 hours	\$283
	Total	\$395

For the refuge to expend significantly more than this level of resources, the research would generally be required to have specific implications to our management. If the research was aimed at answering refuge-specific management questions, we would consider contributing additional resources. In this case, we might expect to contribute the following:

Proposal review, coordination, and SUP preparation –	Refuge Manager, 8 hours	\$ 448
	Refuge Biologist, 16 hours	\$ 566
Field assistance	Refuge Biologist, 160 hours	\$5,659
	Maint. Worker, 40 hours	\$ 961
Use of Facilities and Equipment	Trailer as quarters 30 days @ \$12/day	\$360
	Vehicle or boat 30 days @ \$20/day	\$600
	Total	\$8,594

ANTICIPATED IMPACTS OF THE USE:

Short-term impacts:

Research activities may disturb fish and wildlife and their habitats. For example, the presence of researchers can cause waterfowl to flush from resting and feeding areas, cause disruption of birds on nests or breeding territories, or increase predation on nests and individual animals as predators follow human scent or trails. This is a potential impact of both volunteer-based bird surveys, other bird survey activities, and anuran surveys. Efforts to capture animals, such as for migratory bird banding and certain Delmarva fox squirrel monitoring techniques, can cause disturbance, injury, or death to groups of wildlife or to individuals. To wildlife, the energy cost of disturbance may be appreciable in terms of disruption of feeding, displacement from preferred habitat and the added energy expended to avoid disturbance.

The removal of vegetation or sediments by core sampling methods, a common method for use in wetland research, can cause increased localized turbidity and disrupt non-target plants and animals. Sampling activities associated with many types of research activities can cause compaction of soils and the trampling of vegetation. Installation of posts, equipment platforms, collection devices and other research equipment in open water may present a hazard if said items are not adequately marked and/ or removed at appropriate times or upon completion of the project. Research efforts may also discover methods that result in a reduction in impacts described above.

Long-term impacts:

Long term effects should generally be beneficial by gaining information valuable to refuge management. No long-term negative impacts are expected from the research activities described and the refuge manager can control the potential of long-term impacts through Special Use Permits. Permits for multi-year research projects are renewed annually, providing the opportunity for an analysis of any impacts before issuing a Special Use Permit renewal.

Cumulative impacts:

Cumulative impacts would occur if multiple research projects were occurring on the same resources at the same time or if the duration of the research is excessive. In particular, the refuge must consider the potential impacts of non-FWS research, in conjunction with any FWS-sponsored research also taking place. However, no cumulative impacts are expected because refuge manager can control the potential for cumulative impacts

through Special Use Permits, prohibiting multiple research projects from affecting any given area or species at one time. Managers retain the option to prohibit research on the refuge which does not contribute to the mission of the refuge system or causes undue disturbance or harm. Managers retain the right to revoke or deny renewal for any Special Use Permit if unanticipated short-term, long-term, or cumulative impacts are noted.

Ideally, any research project conducted on the refuge would positively contribute to one or more of the refuge goals and/or objectives. There may be short-term disturbance to plants and wildlife during field investigations -- this is unavoidable in most cases. We will conduct Intra-Service Section 7 Biological Evaluations for any proposal that could be anticipated to have an impact on any federally threatened or endangered species. We will pay particular attention to the joint Service-State Bald Eagle Protection Guidelines for Delaware. These guidelines provide distance and time-of-year restrictions for activities that could disturb nesting or roosting eagles. We will ensure that the refuge or any non-Service researchers obtain any special permits, including collection and banding permits, required by State or Federal law prior to issuing a SUP.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the Prime Hook Draft Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review included a notice of availability published in the Federal Register, a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

All researchers will be required to submit a detailed research proposal that follows Service Policy (Refuge Manual 4 RM 6). Researchers must give us at least 45 days to review proposals before the research begins. If the research involves the collection of wildlife, the refuge must be given 60 days to review the proposal. Researchers must obtain all necessary scientific collecting or other permits before starting the research. We will prioritize and approve proposals based on the need, benefit, compatibility, and funding required for the research.

The refuge may ask regional refuge biologists, other Service divisions, state agencies, or academic experts to review and comment on proposals. Researchers must possess all applicable state and federal permits for the capture and possession of protected species, for conducting regulated activities in wetlands, and for other regulated activities, as applicable to the approved research.

No more than six SUPs will be issued annually for approved research conducted by non-Service personnel. The SUP will list all conditions necessary to ensure compatibility, including stipulations regarding when, where, and how the research will be conducted. The SUPs will also identify a schedule for annual progress reports and the submittal of a final report or scientific paper. Managers retain the option to prohibit research on the refuge which does not contribute to the purposes of the refuge or the mission of the Refuge System, or which causes undue resource disturbance or harm.

Researchers will be required to submit a final report to the refuge upon completing their work. For long-term studies, we may also require interim progress reports. All reports, presentations, posters, articles or other publications will acknowledge the Refuge System and Prime Hook National Wildlife Refuge as partners in the

research. Non-Service organizations and personnel conducting research on the refuge will provide the Service with all data collected and/or reports. The research organization/agency or personnel in conjunction with the Service will retain the use and ownership of all data/reports.

Any research data collected under a SUP on the refuge shall be jointly owned by the Service and the researcher. The researcher will have the first opportunity for publication of results associated with the data, but appropriate credits to the United States Fish and Wildlife Service and the refuge shall be included in any formally published article, provided that the Service does not otherwise deem it appropriate to issue a disclaimer.

The refuge retains the right to revoke a SUP, or deny future renewal, if unacceptable impacts to refuge habitat or species are noted.

JUSTIFICATION:

The Service encourages research on national wildlife refuges to promote new information which will improve the quality of refuge and other Service management decisions, to expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general, and to provide the opportunity for students and others to learn the principles of field research.

In accordance with 50 CFR 26.41, research conducted by non-Service personnel, as described in this compatibility determination, will not materially interfere with, or detract from, the fulfillment of the National Wildlife Refuge System mission or the purposes for which the refuge was established.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE:

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Mosquito Management

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

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

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

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

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

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

Not Appropriate **Appropriate**

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Mosquito Management

NARRATIVE:

The use is mosquito and mosquito-borne disease management, which includes surveillance and, when warranted, chemical control interventions or the maintenance of current refuge biological mosquito control systems known as Open Marsh Water Management (OMWM). Mosquito and mosquito-borne disease management is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended by the National Wildlife Refuge System Improvement Act.

Service interim *National Wildlife Refuge System Mosquito Management Guidelines* (USFWS 2005) states “when necessary to protect human, wildlife, or domestic animal health, the Service will reduce mosquitoes associated with health threats using an integrated pest management (IPM) approach, including when practical, compatible, non-pesticide actions that reduce mosquito production. Except in officially determined health emergencies, any procedure the Service uses to reduce mosquito production will meet compatibility requirements as found in 603 FW 2 and must give full consideration to the safety and integrity of non-target organisms and communities, including federally listed threatened and endangered species.”

The Delaware Mosquito Control Section (The Section), under Service permits, has requested to conduct mosquito management on the refuge since its establishment in 1963. The Section of the Delaware Division of Fish and Wildlife, under the supervision of the Department of Natural Resources and Environmental Control, is mandated to “*take all necessary and proper steps and measures for the eradication of mosquitoes, including but not limited to source reduction methods that alter or eliminate habitats of immature mosquitoes, biological controls such as native fish stocking, and the application of insecticides by air or ground to control immature or adult mosquitoes, all done in order to effect nuisance relief, to protect public health, and to help avoid adverse impacts to local economies from severe mosquito infestations...*” (State of Delaware Mosquito Control’s Enabling Statute: Delaware Code Title 16, Chapter 19).

COMPATIBILITY DETERMINATION

USE:

Mosquito Management

REFUGE NAME:

Prime Hook National Wildlife Refuge

DATE ESTABLISHED:

April 8, 1963

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

The Improvement Act provides compatibility standards for refuge uses and directs the U.S. Fish and Wildlife Service (Service) to "ensure that the biological integrity, diversity, and environmental health of the Systems are maintained." In order to fulfill this mission, national policy and guidelines have been developed to provide refuge managers clear direction and procedures for making determinations regarding wildlife conservation and mosquito management on national wildlife refuge lands. Both interim guidelines and a draft policy (Federal Register/Volume 72, No. 198/Monday, October 15, 2007/Notice) describe the process we will follow to determine if and how to manage mosquito populations on lands administered within the Refuge System. The principles underlying both interim and draft policies have been incorporated into this Compatibility Determination (CD) and will be amended as required when final codified policy appears as part 601, chapter 7 of the Fish and Wildlife Service Manual.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is mosquito and mosquito-borne disease management, which includes surveillance and, when warranted, chemical control interventions or the maintenance of extant biological mosquito control systems known as Open Marsh Water Management (OMWM). Mosquito and mosquito-borne disease management is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended by the National Wildlife Refuge System Improvement Act of 1997.

(b) Where will the use be conducted?

The use will occur in areas specified in a refuge-issued annual special use permit, as needed, to protect human health and wildlife and domestic animal safety from mosquito-borne disease. Areas to be treated will vary in size and location based on population monitoring and threshold criteria for treatment, to be determined in a refuge specific mosquito management plan.

(c) When would the use be conducted?

Mosquito control will occur only as needed, and on an irregular and short-term basis when it is necessary to protect the health and safety of humans, wildlife, or domestic animals. Surveillance activities associated with this use will be conducted from April through October under the conditions of this compatibility determination, a refuge-specific mosquito management plan, and/or a special use permit, all in accordance with Service interim and final policies for mosquito management on National Wildlife Refuges, as well as Biological Integrity Diversity and Environmental Health (BIDEH) policy (USFWS 2001).

(d) How will the use be conducted?

On October 15, 2007, the Service published in the Federal Register its “Draft Mosquito and Mosquito-Borne Disease Management Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997.” Until the draft policy is finalized, we will follow the “Interim Guidance for Mosquito Management on National Wildlife Refuges,” prepared in spring 2005. This document provides refuges with interim guidance on addressing mosquito-associated health threats in a consistent manner. The guidance states that refuges will not conduct mosquito monitoring or control unless it is necessary and, when compatible, to protect the health of a human, wildlife, or domestic animal population. If there is a documented health emergency, the Service will work with local and state mosquito managers to minimize risks to human health, while at the same time protecting refuge resources.

Mosquito monitoring and control on the refuge will be managed under a mosquito management plan developed by refuge in conjunction with State officials. The plan will provide the specifics on how and when the refuge will allow monitoring and, if necessary, control of mosquitoes on refuge-owned lands, using predetermined threat levels and, or mosquito vector population densities. The Delaware Mosquito Control Section (DMCS), is responsible for monitoring larval and adult mosquitoes on the refuge. Additional details and restrictions on monitoring and control (generally access, timing and location) within refuge boundaries will be described in an annual special use permit issued to DMCS. Variation in annual permit restrictions are necessary to accommodate wildlife breeding, roosting and feeding activity; endangered species; administrative needs; public use management; research or monitoring protocols; and other conflicts that may arise.

The management plan will be developed and annual permit issued by the Service to ensure that there will be no significant adverse impacts on the refuge’s wildlife and habitats. Treatment regimens may vary annually, depending on the current conditions of disease presence and mosquito abundance.

The purpose of monitoring is to detect changes in mosquito populations that indicate an increased risk to human or wildlife health. Because there is a documented history of mosquito-borne diseases in this area, the refuge will allow monitoring of mosquitoes on an annual basis, therefore a SUP will be issued annually before mosquito breeding season. The goal of early mosquito larvae monitoring is to rapidly detect relative and absolute changes in population size that can indicate an increased risk to human, wildlife, or domestic animal health. Mosquito monitoring on refuge will document composition to genus level, and estimate population size and distribution across refuge wetland habitats during the breeding season, using standard methods employed by mosquito control professionals.

In addition, the goal of surveillance for mosquito-borne disease is to monitor and test wildlife, especially birds and adult mosquitoes for pathogens. Such testing may include captive sentinel birds or other reservoir hosts for levels of disease activity (pathogens or antibodies). High levels of pathogenic activity would indicate higher health risks.

Federal and state public health representatives would officially identify a high risk for mosquito-borne disease based on documented mosquito vector population density and, or disease activity in humans or wildlife. In addition, the Secretary of the Interior has the authority to identify a high risk for mosquito-borne disease independent of other Federal or state public authorities. Such a high risk determination indicates an imminent risk of serious human disease or death.

High mosquito vector density and, or increased incidence of disease in humans or wildlife may warrant pesticide treatments to refuge lands to decrease vector populations and lower health risks. Early detection of pathogenic activity, combined with up-to-date mosquito vector population monitoring are the best management practices to allow for timely chemical intervention measures to occur. Timely intervention would reduce high disease risks to humans and reduce the use of chemicals that negatively impact wildlife resources.

In the absence of a health threat, we will allow the State to manage mosquitoes in such a way as to meet refuge statutory obligations to maintain and enhance the biological integrity, diversity, and environmental health of refuge lands. Therefore, we have evaluated the impacts of the mosquito control methods currently in use by DMCS.

Larvicides

Like other varieties of the natural soil bacterium, *Bacillus thuringiensis* (Bt), *Bacillus thuringiensis israelensis* (Bti) is a stomach poison that must be ingested by the larval form of the insect in order to be effective (Exttoxnet 1996a). This soil bacterium contains crystalline structures containing protein endotoxins that are activated in the alkaline conditions of an insect's gut. These toxins attach to specific receptor sites on the gut wall and, when activated, destroy the lining of the gut and eventually kill the insect. The toxicity of Bt to an insect is directly related to the specificity of the toxin and the receptor sites. Without the proper receptor sites, the Bt will simply pass harmlessly through the insect's gut. Several varieties of Bt have been discovered and identified by the specificity of the endotoxins to certain insect orders. *Bacillus thuringiensis* var. *kurstaki*, for example, contains toxins that are specific to lepidopterans (butterflies and moths), while Bti is specific only to certain primitive dipterans (flies), particularly mosquitoes, black flies, and some chironomid midges. Bti is not known to be directly toxic to non-dipteran insects (Exttoxnet 1996a).

Due to specificity of the effects of Bti on the insect order, diptera, this insecticide is deemed compatible for use, under the stipulations prescribed at the end of this CD and the Mosquito Management Plan. Bti is the preferred chemical control option and should be used under appropriate conditions.

Methoprene is an EPA toxicity class IV general use pesticide, considered slightly to practically nontoxic (EPA 2001). Methoprene is a synthetic mimic of a naturally produced insect hormone, juvenile hormone (JH). All insects produce JH in the larval stages, with the highest levels occurring in the insect's early developmental stages. As an insect reaches its final stage of larval development, the level of JH is very low. This low level of JH triggers the development of adult characteristics. When an insect is exposed to Methoprene, a hormonal imbalance in the development of the insect results, and it fails to properly mature into an adult. The insect eventually dies in the pupal stage. The most susceptible stages of development to Methoprene are the later instars (for mosquitoes, third and fourth instars). In mosquito control applications, Methoprene is applied to the larval breeding habitat. Methoprene is a non-specific contact insecticide that does not need to be ingested like Bti (Tomlin 1994). Larvae will continue to feed and may reach the pupal stage, but they will not emerge as adults.

Due to the potential adverse affects of Methoprene on non-target insects, Bti should be the first chemical of choice for use on the refuge. However, the refuge recognizes that Bti exhibits limited efficacy under certain conditions; under those conditions Methoprene would be the prudent alternative. Only formulations with short term residuals (5-10 days) may be used for larval mosquito control. Use of Methoprene products with long term residuals such as Altosid XR-G, 30-Day Briquettes, or XR Briquettes will not be permitted.

Mosquito control chemicals will be applied using handheld, backpack and aerial dispersal methods. DMCS may conduct mosquito surveillance using dip samples, light/CO2 traps, and landing rates. *Bacillus thuringiensis* and methoprene will be applied as specified in the product EPA label, the annual Service Pesticide Use Proposal, and the annual refuge special use permit.

Adulticides

Adulticides are inherently non-specific, i.e., they kill non-target species as well as mosquitoes. The most recent adulticides used on the refuge include the Naled products of Dibrom and Trumpet EC. Naled is a EPA Toxicity Class I (Highly Toxic) general use pesticide, having the signal word “Danger” on the specimen label (Amvac 2005). The EPA considers the active ingredient Naled, based on acute toxicity data, to be moderately to highly toxic to birds, moderately toxic to mammals, highly toxic to honey bees, moderately to very highly toxic to freshwater fish, and very highly toxic to freshwater aquatic invertebrates (EPA 2002). It is fast acting organophosphate adulticide licensed for controlling aphids, mites, flies, and mosquitoes. Naled is a cholinesterase inhibitor, a compound found in animals including mammals, birds, fish and other insects. Naled damages the nervous system, and at sufficiently high exposures, can result in respiratory paralysis and death (2005a).

It should be noted, that acute toxicity studies are conducted in a lab using chemical concentrations that are unlikely to be encountered during proper use in the field according to the pesticide label. Nevertheless, the acute toxicity data can be used to make general statements about the relative toxicity of various chemicals. For the purpose of comparison, the larvicide methoprene (also considered for compatibility in this document) ranks as a toxicity class IV, and is considered slightly to practically nontoxic (Exttoxnet 1996). Methoprene is used in the production of various foods, including meat, milk, eggs, mushrooms, peanuts, rice, and cereals (Exttoxnet 1996). It is practically nontoxic when ingested or inhaled and slightly toxic by dermal absorption. Methoprene is used in cattle feed to deter insect larvae from growing in cattle feces. Continued use of Methoprene is permitted on the refuge per this CD, while Naled is not.

EPA’s Interim Reregistration Eligibility Decision (IRED) for Naled, published in 2002, evaluates the use of Naled for several purposes. The IRED evaluates the “risk” of various formulations and application techniques of Naled to humans as well as various wildlife species. While there are many definitions of the word risk, **EPA considers risk to be the chance of harmful effects to human health or to ecological systems** resulting from exposure to an environmental stressor. A stressor is any physical, chemical, or biological entity that can induce an adverse response. Stressors may adversely affect specific natural resources or entire ecosystems, including plants and animals, as well as the environment with which they interact (<http://epa.gov/riskassessment/basicinformation.htm#risk>).

EPA uses a process called “risk assessment” to characterize the nature and magnitude of health risks to humans (e.g., residents, workers, recreational visitors) and ecological receptors (e.g., birds, fish, wildlife) from chemical contaminants and other stressors that may be present in the environment.

At EPA, environmental risk assessments typically fall into one of two areas:

- *Human Health*
- *Ecological*

Risk assessment is, to the highest extent possible, a scientific process. In general terms, risk depends on the following factors:

- How much of a chemical is present in an environmental medium (e.g., soil, water, air),
- How much contact (exposure) a person or ecological receptor has with the contaminated environmental medium, and
- The inherent toxicity of the chemical.

Based on this, the risk assessor evaluates the frequency and magnitude of human and ecological exposures that may occur as a consequence of contact with the contaminated medium, both now and in the future.

This evaluation of exposure is then combined with information on the inherent toxicity of the chemical (that is, the expected response to a given level of exposure) to predict the probability, nature, and magnitude of the adverse health affects that may occur. In the ideal world, all risk assessments would be based on a very strong knowledge base (i.e., reliable and complete data on the nature and extent of contamination, fate and transport processes, the magnitude and frequency of human and ecological exposure, and the inherent toxicity of all of the chemicals). However, in real life, information is usually limited on one or more of these key data needed for risk assessment calculations. This means that risk assessors often have to make estimates and use judgment when performing risk calculations, and consequently all risk estimates are uncertain to some degree. For this reason, a key part of all good risk assessments is a fair and open presentation of the uncertainties in the calculations and a characterization of how reliable (or how unreliable) the resulting risk estimates really are (<http://epa.gov/riskassessment/basicinformation.htm#risk>).

Developing a risk assessment is often an iterative process, which involves researchers identifying and filling data gaps in order to develop a more refined assessment of the risk. This in turn may influence the need for risk assessors and risk managers to refine the scope of the risk assessment further triggering the need for more data or new assumptions.

As described in EPA's "*Risk Characterization Handbook*," risk management is the process which evaluates how to protect public health. Examples of risk management actions include deciding how much of a substance a company may discharge into a river; deciding which substances may be stored at a hazardous waste disposal facility; deciding to what extent a hazardous waste site must be cleaned up; setting permit levels for discharge, storage, or transport; establishing national ambient air quality standards; and determining allowable levels of contamination in drinking water.

Risk assessment provides "Information" on potential health or ecological risks, and risk management is the "Action" taken based on consideration of that and other information, as follows:

- Scientific factors provide the basis for the risk assessment, including information drawn from toxicology, chemistry, epidemiology, ecology, and statistics - to name a few.
- Economic factors inform the manager on the cost of risks and the benefits of reducing them, the costs of risk mitigation or remediation options and the distributional effects.
- Laws and legal decisions are factors that define the basis for the Agency's risk assessments, management decisions, and, in some instances, the schedule, level or methods for risk reduction.
- Social factors, such as income level, ethnic background, community values, land use, zoning, availability of health care, life style, and psychological condition of the affected populations, may affect the susceptibility of an individual or a definable group to risks from a particular stressor.
- Technological factors include the feasibility, impacts, and range of risk management options.
- Political factors are based on the interactions among branches of the Federal government, with other Federal, state, and local government entities, and even with foreign governments; these may range from practices defined by Agency policy and political administrations through inquiries from members of Congress, special interest groups, or concerned citizens.
- Public values reflect the broad attitudes of society about environmental risks and risk management.

One purpose of an EPA risk assessment and re-registration analysis is to determine precautions that may be taken to reduce the level of risk to humans and the environment. In addition to stipulations on the use of Naled already determined in previous registration endeavors, the EPA in 2002 introduced three additional requirements designed to mitigate risk to non-target species. They are (EPA 2002):

- Reduce application rates for control of black fly from 0.25 to 0.1 lbs/ai/A, and reduce rates on peaches and almonds from 2.8 to 1.875 lbs/ai/A.
- Require buffer zones around permanent bodies of water to reduce runoff.
- Establish spray setbacks to reduce spray drift for agricultural uses.

Though these requirements largely target agricultural use of Naled, typically at higher concentrations than would be permitted for mosquito control, Naled at all permitted concentrations will continue to have a level of impact on non-target terrestrial invertebrates, if only in the short term. Despite the fact that a limited number of studies indicate a rebound of non-target insect abundance in a relatively short period of time, the impact of a short term loss of an important component of the food web is unknown. Other potential shifts in ecological process are not understood. Additionally, Wildlife Action Plans from numerous states express concern over the potential impacts of a range of mosquito control techniques, especially chemical control on non-target species, including Delaware (DDFW 2006), New Jersey (NJDFW 2008), Virginia (VDGIF 2005), New York (NYDEC 2005), Maryland (MDNR 2005), North Carolina (NRWRC 2005) Florida (FFWCC 2005), New Hampshire (NHFGD 2005), Rhode Island (RIDFW 2005), Maine (MDIFW 2005), Connecticut (CDEP 2005), Vermont (VDFW 2005), and Massachusetts (MEOEPA 2006).

Despite the EPA's having gone through the risk assessment process, and having licensed the use of Naled for mosquito control, using specific tools, under specific conditions, the refuge manager must adhere to additional standards, policies and laws specifically governing the management of National Wildlife Refuges. They include:

- National Wildlife Refuge Improvement Act of 1997
- Biological Integrity, Diversity, and Environmental Health Policy (USFWS 2001)
- Appropriate Refuge Uses Policy (USFWS 2006a)
- Compatibility Policy (USFWS 2000)
- Mission of the National Wildlife Refuge System (USFWS 2006b)
- Prime Hook National Wildlife Refuge Purposes.

Within the context of refuge specific laws and policies, use of chemical pesticides, depending on circumstances, may materially interfere with and detract from the fulfillment of the Refuge System mission and the purposes of the refuge.

Due to the affects of adulticides on non-target terrestrial organisms, and the potential effects on ecological processes, adulticides including Naled, may only be used on lands owned and managed by Prime Hook National Wildlife Refuge if there is a documented public health emergency or as mandated by the Secretary.

Therefore, all further discussion of mosquito chemical control in this CD will be limited to Bti or Methoprene.

Open Marsh Water Management

The Delaware Mosquito Control Section, under Service permits, has controlled mosquitoes on the refuge since its establishment in 1963. Until 1995 Temephos (Abate) was the primary larvicide applied on Prime Hook marshes, while naled (Dibrom) and resmethrin (Scourge) were the primary adulticides used.

Today, DMCS's preferred method of control for mosquitoes is to use a source reduction technique of Open Marsh Water Management (OMWM). OMWM is a method for controlling salt-marsh mosquitoes using physical alternations of marsh habitat. Ponds and ditches are selectively excavated in order to create unsuitable environs for mosquito production while creating suitable habitat for larvivorous fishes. Such biological controls are effective in reducing mosquito production by 95% in treated areas (DNREC 2008).

Extensive OMWM systems have been installed on approximately 1,350 refuge acres from 1980 to 2002. The refuge participated in a pilot study beginning in 1980 to demonstrate OMWM efficacy was initiated by excavating a 6-acre treatment site parallel to a 6-acre control site. Four years later a 90 to 99% reduction in mosquito production was recorded by DMCS in the treatment site. An Environmental Assessment to conduct OMWM on the refuge was then completed in 1988 to treat 960 acres of salt marsh in Unit I and 430 acres in Unit IV. This work was completed in 1994 and 1,880 acres were removed from the mosquito pesticide spraying program. In 2001, DMCS returned to Unit I to excavate an additional 10.2 acres (3.2 acres of ponds and 7.0 acres of radial ditches) removing an additional 362 acres from the spray program.

The OMWM treated areas at the refuge were once grid ditched by the Civilian Conservation Corps (CCC) in the 1930's as a mosquito control project. The objectives of the two control methods differ in that grid ditching attempted to reduce the water table, thereby draining suitable mosquito breeding sites, while OMWM functions by creating reservoirs (maintaining or increasing water coverage) for mosquito eating fish. Grid ditching at that time likely did more damage to the marsh than OMWM. Nevertheless, OMWM does, to some measurable degree, alter the marsh hydrology and subsequently, the plant communities the marsh supports.

Most management options involve tradeoffs. In terms of Service Trust species, for example, a marsh receiving an OMWM treatment is likely to increasingly support beds of submerged aquatic vegetation, an important waterfowl food, and increased density and access to small fish by wading birds. In terms of tidal wetland or hydrologic function, ditching can alter the flooding regime and degree of saturation. OMWM eliminates net emergent marsh acreage by converting these areas to open water. Evapotranspiration rates are impacted. OMWM construction also introduces temporary bare areas which may increase the spread of invasive plant by creating areas of exposed soil that can be invaded by non-native plants. In some cases, marsh elevations have been raised in areas of sidecast material. As a result, marsh plant communities are altered. OMWM, therefore, alters the biological and structural integrity of the marsh, may diminish physical and biochemical tidal wetland functions and values, and therefore may not meet the criteria of the BIDEH policy.

Furthermore, preliminary data from marsh accretion monitoring at Forsythe NWR, New Jersey, where nearly all marshes were grid ditched in the 1930's, indicate that marshes with OMWM treatments and grid ditched marshes may be accreting at different rates (Kevin Holcomb, pers. comm.). The mechanism/s that would influence variable accretion rates within this system is not well understood, but is likely due to water movement across the marsh and rates of sediment deposition. Another likely factor relates to the ability of marsh vegetation to accumulate organic material (peat). It is important to determine if the structural or biological effects of OMWM treatments are detrimental to marsh accretion rates, and under what conditions, since the accretion process is vital for tidal marshes to persist in light of rising sea levels.

Despite the fact that OMWM appears to create a marsh that is less drained than a grid-ditched system, the refuge believes that BIDEH principles call for minimizing ditching or artificial pond creation in a saltmarsh. However, the refuge will continue to evaluate the merits of creating OMWM systems in formerly grid ditched marshes, and understanding the tradeoffs between allowing OMWM activity (e.g. reduced threats to human health, but potential impairment of marsh accretionary and hydrologic processes) and leaving marshes unaltered. Refuges in the Northeast will be installing wetland surface elevation monitoring stations inside and outside OMWM treatments, using Surface –Elevation Tables (SETs), and comparing marsh surface trajectories to local rates of sea level rise, to address some of the uncertainty regarding the potential effects of OMWM.

Additionally, the refuge has a concern regarding the potential detrimental effect of OMWM on secretive marsh birds of conservation concern. The Service is concerned about providing quality habitat for obligate saltmarsh passerines such as the Seaside Sparrow and Saltmarsh Sharp-tailed Sparrow, both of which are listed as “Birds of Conservation Concern”. Saltmarsh Sharp-tailed Sparrow is described as Vulnerable on the IUCN Red List. Seaside Sparrow is listed as a priority species in the Bird Conservation Region 30 list.

The Delaware Wildlife Action Plan (DNREC 2006) states, *Published reports indicate few effects from this (OMWM) management on an array of species and habitat measures. However, there was sufficient concern about OMWM impacts on black rail – a possible indicator species for Tidal High Marsh – to lead to a cessation of this practice in Maryland in the early 1990s. Circumstantial evidence from at least one site in Delaware supports this concern, and the issue warrants further study.*

The refuge is therefore concerned about potential negative impacts to secretive marsh birds, as well as the uncertainty of the effect of OMWM on marsh accretion rates (see CCP/EIS for further discussion of SLR). The refuge has concluded that while currently existing OMWM projects may be maintained as a non-pesticide alternative to mosquito population control, these existing OMWM projects may not be expanded nor any new projects initiated on refuge lands until the effect of OMWM on refuge marsh accretion is better understood. The refuge will also seek to support additional studies that address OMWM effects on obligate saltmarsh passerines. At least three to five years of additional research OMWM treatments will be conducted before decisions will be made to construct new OMWM treatment sites in previously grid-ditched marshes. Excavations in existing OMWM systems will be permitted for maintenance purposes when there are obvious, quantifiable problems associated with the mosquito control function of these systems, when OMWM systems have structurally failed, or when increased mosquito production levels are experienced.

The refuge values intact emergent wetlands with a high degree of functional integrity. Ultimately, as new research and monitoring sheds light on refuge marsh accretion rates and obligate salt marsh breeding bird health, the refuge may determine that filling extant grid ditches and OMWM systems, and restoring intact marsh, may be necessary to allow refuge tidal wetlands to keep pace with SLR.

Integrated Pest Management (IPM) Approach

We are incorporating an improved IPM approach to mosquito breeding problems and limiting chemical interventions, integrating the existence of multiple natural predator populations found in functional refuge wetland habitats, and using strategies to preserve natural control agents. There are two ways to mitigate anticipated negative impacts of IPM to natural mosquito predators:

- Reduce the use of adulticides
- Increase threshold values that trigger chemical intervention as a whole.

DMCS currently uses thresholds to determine how, when, and where to conduct mosquito control treatments. It is likely that these thresholds may require revision under the Mosquito Management Plan to bring them in line with refuge policies.

Implementing more effective pest management strategies for mosquito control can be achieved by using a tiered risk-assessment decision-making process that would reduce the use of adulticides until a documented high risk situation occurs (*Federal Register 2007*). In the past mosquito breeding data did not take into account the presence of natural predators. Balanced predator-prey populations can limit mosquito production and if vertebrate and invertebrate predator populations are adequate and in place to control mosquitoes, thresholds for chemical use should be higher, especially in low health risk situations (*Federal Register 2007*).

In summary, the refuge will not use adulticides solely for nuisance relief. Bti products will be employed over Methoprene products, when possible. By favoring the larvicide that would have the least adverse impacts on nontarget invertebrates, fewer disruptions to food webs critical for migratory birds and decrease lethal effects on natural mosquito predators, such as larval forms of odonates, hemipterans, and coleopterans will be experienced.

(e) Why is the use being proposed?

Who is Requesting the Use

DMCS, under Service permits, has conducted mosquito management on the refuge since its establishment in 1963. DMCS is under the Delaware Division of Fish and Wildlife and supervised by the Department of Natural Resources and Environmental Control. DMCS is mandated to “*take all necessary and proper steps and measures for the eradication of mosquitoes, including but not limited to source reduction methods that alter or eliminate habitats of immature mosquitoes, biological controls such as native fish stocking, and the application of insecticides by air or ground to control immature or adult mosquitoes, all done in order to effect nuisance relief, to protect public health, and to help avoid adverse impacts to local economies from severe mosquito infestations...*” (State of Delaware Mosquito Control’s Enabling Statute: Delaware Code Title 16, Chapter 19).

Three other pertinent parts of the Mosquito Control’s Enabling Statute (in State Code) include:

- “*Treat as nuisances all stagnant pools of water or other breeding places of mosquitoes to help protect the public’s well-being and health.*”
- “*Enter upon land, whether privately-owned or not, for purpose of determining the breeding places of immature mosquitoes or occurrence of adult mosquitoes, and treat with proper means all such breeding places or adult mosquito populations wherever situated, doing no unnecessary damage.*”
- “*Control measures taken for eradication of mosquitoes shall be, to the extent practicable, not injurious to pets, livestock or wildlife.*”

The State’s mandate to “take all necessary and proper steps and measures for the eradication of mosquitoes”, comes in direct conflict with the laws and policies of the National Wildlife Refuge System which is designed to direct the conservation and management of the nation’s limited biological resources, i.e. the National Wildlife Refuge Improvement Act of 1997, the Biological Integrity, Diversity, and Environmental Health Policy (USFWS 2001), Appropriate Refuge Uses Policy (USFWS 2006a), Compatibility Policy (USFWS 2000), the Mission of the National Wildlife Refuge System (USFWS 2006b), and the purposes for which Prime Hook National Wildlife Refuge was established. Based on these Service mandates, we have eliminated the use of adulticides on the refuge unless there is a documented public health emergency or as mandated by the Secretary. However, where and when appropriate, the refuge will actively cooperate with DMCS based on these directives and the sound professional judgment of the refuge manager, as directed by Compatibility Policy.

National Wildlife Refuge Mosquito Control Policy

The Service’s interim National Wildlife Refuge System Mosquito Management Guidelines (USFWS 2005), state “*when necessary to protect human, wildlife, or domestic animal health, the Service will reduce mosquitoes associated with health threats using an integrated pest management (IPM) approach, including when practical, compatible, non-pesticide actions that reduce mosquito production. However, except in officially determined health emergencies documented by the State Dept. of Health, any procedure the Service uses to reduce mosquito production will meet compatibility requirements as found in 603 FW 2, must not materially detract from refuge purposes, and must give full consideration to the safety and integrity of non-target organisms and communities, including federally listed threatened and endangered species.*”

Mosquito-borne Disease History in Delaware

There are two mosquito-borne viral diseases historically or currently endemic/enzootic on the Delmarva Peninsula, including Delaware: Eastern Equine Encephalitis (EEE), and West Nile Virus (WNV). Both are zoonotic diseases maintained in wildlife that only secondarily affect humans.

Eastern Equine Encephalitis

The more serious of the two diseases for humans is EEE, although it is relatively rare. Nationwide (Figure 1), the Center for Disease Control reports only 257 cases of neuroinvasive EEE over the period 1964-2009, although the mortality rate for those contracting the disease is high (Please refer to: http://www.cdc.gov/ncphi/diss/nndss/casedef/carboviral_current.htm for description of neuroinvasive EEE). The most recent EEE activity in humans in Delaware was in the 1970's, when 3 cases were identified in the state. There have been no confirmed human cases of EEE in Delaware since 1979 (DHSS 2009). However, a few mosquitoes, sentinels, or veterinary animals have tested positive for the EEE virus somewhere on the Delmarva Peninsula nearly every year since 2003, indicating that the virus is being maintained within the wildlife cycle (Appendix A).

Figure 1. Eastern Equine Encephalitis Virus Neuroinvasive Disease Cases Reported by State, 1964-2008



EEE is an encephalitis virus that routinely occurs in songbirds but for the most part is not fatal to wild birds. It is circulated by a difficult-to-control woodland mosquito species that feeds exclusively upon songbirds. Salt marsh or floodwater mosquitoes biting infected birds can then transmit the disease to humans or horses. The public health risk from EEE is greatest from early August through the first killing frost. It is not unusual to find a few positive tests for EEE in sentinel chickens, or to have EEE horse fatalities each year. It should be noted however that an effective vaccine is available for horses, though many horse owners choose not to have their animals vaccinated.

West Nile Virus

West Nile Virus (WNV) is a virus that mainly infects birds but is also known to infect skunks, squirrels, and bats. The main route of human infection is through the bite of an infected mosquito. The virus is transmitted through mosquito vectors with birds serving as amplifying hosts, developing sufficient viral levels to transmit the infection to other biting mosquitoes which go on to infect more birds. Robins and the American crow are the most common bird carriers. Primary WNV vectors in Delaware are *Culex pipiens* and the subspecies *C. quinquefasciatus* in fresh water, and *Culex salinarius* in saltmarsh/brackish-water.

For those humans that experience severe illness following transmission by an infected mosquito, WNV interferes with normal central nervous system functioning and causes inflammation of brain tissue, potentially resulting in death. Unlike some of the tick transmitted diseases, there is no scientific evidence indicating that people can be chronically infected with WNV. What remain in a person's body for long periods of time are antibodies

and “memory” white blood cells (T-lymphocytes) that the body produces to the virus. These antibodies and T-lymphocytes last for years, and may last for the rest of a person’s life. Both antibodies and “memory” T-lymphocytes provide future protection from the virus. It is assumed that immunity will be lifelong; however, it may wane in later years (<http://www.cdc.gov/ncidod/dvbid/westnile/qa/transmission.htm>).

In areas where the virus is circulating, very few mosquitoes are infected with the virus. Even if the mosquito is infected, less than 1% of people who get bitten and become infected, will get severely ill. The chance you will become severely ill from any one mosquito bite is extremely small. Less than 1% of all (including people with asymptomatic infections) people who become infected with WNV will develop severe illness (<http://www.cdc.gov/ncidod/dvbid/westnile/qa/cases.htm>). A study published by the CDC in 2009 in the journal, Emerging Infectious Diseases, calculated the prevalence of WNV in the US population to be approximately 1%, or approximately 3 million total infections during the period 1999-2008 (Planitzer et al 2009).

WNV was first recognized in the US in 1999. Delaware’s first confirmed human case of WNV occurred in 2002. During 2003, 17 human cases were reported, of which two resulted in deaths. There were no human cases in 2004 and 2006, 2 were reported in 2005, 1 in 2007 and 1 in 2008, for a total of 22 cases in 8 years. On the whole the US reported 29,532 cases during the same period, 2002-08, with a total of 1,144 deaths. As a comparison, Dushoff et al. (2006) estimated that the average number of deaths from seasonal flu, and associated complications in the U.S. was 41,400 / year (95% confidence interval: 27,100, 55,700) over the period 1979–2001.

These WNV numbers reflect both mild and severe human disease cases that have been reported to ArboNET by state and local health departments. ArboNET is the national, electronic surveillance system established by CDC to assist states in tracking WNV and other mosquito-borne viruses. The high proportion of neuroinvasive disease cases among reported cases of WNV disease reflects surveillance reporting bias. Serious cases are more likely to be reported than mild cases because mild cases can resemble other diseases, e.g. fever, headache, tiredness, and body aches. Also, the surveillance system is not designed to detect asymptomatic infections (http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlcasecount06_detailed.htm). Therefore, as discussed above, the numbers reported in the US as a whole, 29,532, is considered well below the true number of humans exposed to the virus, which is calculated to be approximately 3 million. Additionally, multiple birds and horses tested positive during this timeframe (Appendix A).

Disease Surveillance

DMCS and the Division of Public Health have been conducting mosquito-borne disease surveillance and mosquito monitoring programs for the past 27 years in Delaware. Twenty-three sentinel chicken stations and 36 permanent adult mosquito traps monitor mosquito-borne disease activity throughout the state. Additional mobile mosquito traps are used when increased surveillance is warranted. Weekly blood samples are collected from the chickens and analyzed for the presence of EEE and/or WNV by the Division of Public Health laboratory.

Mosquito monitoring conducted by state mosquito experts indicates that 57 species of mosquitoes occur in Delaware of which 19 species pose disease-vector problems. These species include 11 floodwater species, 4 woodland species, and 4 predominantly urban species, i.e., mosquitoes that are mostly found in urban settings as container breeders, or in sewer catch basins, and storm water and waste water lagoons. All 19 species have been found to be WNV-positive, though not all have been found to be competent vectors of WNV (Sardelis 2001). Four species are also EEE vectors, with the common salt marsh mosquito (*Ochlerotatus sollicitans*) being a primary EEE vector. The common house mosquito (*Culex pipiens*) is the suspected primary WNV vector. These species are the target species for mosquito and mosquito-borne disease management on the refuge and are listed below:

Open Floodwater Species

Ochlerotatus sollicitans – Common saltmarsh mosquito (primary EEE vector)

O. cantator – Brown saltmarsh mosquito

O. taeniorhyncus – Black saltmarsh mosquito (EEE vector)

Aedes vexans – Floodwater mosquito (EEE vector)

Culex salinarius – Unbanded or “Little Sal” saltmarsh mosquito

Coquilletidia perturbans – Cattail or irritating mosquito (EEE vector)

Anopheles punctipennis – Mottled-wing mosquito or “Punkies”

A. quadrimaculatus – Common malaria mosquito or “Quads”

A. bradleyi – “Brads”

A. walkeri
Psorophora columbiae – Glades mosquito
P. ciliate – “Gallinipper”

Woodland Species

Ochlerotatus canadensis – Woodland pool mosquito
O. triseriatus – Eastern treehole mosquito
O. grossbecki
Psorophora ferox – White-footed woods mosquito

Urban Species

Aedes albopictus – Asian tiger mosquito or “Albies”
Ochlerotatus japonicus – Japanese mosquito
Culex pipiens – Common house mosquito

AVAILABILITY OF RESOURCES:

The administration of mosquito and mosquito-borne disease management on the Prime Hook NWR unit of the Coastal Delaware National Wildlife Refuge Complex, the following staffing costs are estimated:

Staffing Needs To Conduct Use Of Mosquito Management On PHNWR

Position	Involvement	FTE	Cost
Refuge Manager	General Oversight	0.05	\$5,000
Wildlife Biologist	Field visits and reviews Mosquito Management Plan development and implementation, preparations of PUPS, SUPS, and Pesticide Use reporting, oversight of mosquito-borne disease monitoring, vector control activities, and field reviews of OMWM systems. Involvement in coordination and/or oversight of mosquito monitoring activities.	0.1	\$6,750
Total FTES & Staffing Costs		0.15 FTE	\$11,750

ANTICIPATED IMPACTS OF THE USE:

For a more complete analysis of the impacts of mosquito management, refer to chapter 5 of the CCP/EIS.

There are many potential negative impacts of mosquito management activities that pose threats to the biological integrity, diversity and environmental health of refuge lands and waters, and detract from the conservation of the refuge’s resources of concern. Two forms of chemical mosquito control are permitted.

Bti (*Bacillus thuringiensis var. israelensis*) is a stomach poison that must be ingested by the larval form of the insect in order to be effective. Bti is an EPA toxicity class III general use pesticide and is practically non-toxic to animals (Kamarin 1997). The issue of Bti concentration is important with regard to impacts on nontarget organisms. Of particular concern is the potential for Bti to kill midge larvae. Chironomid (non-biting midge) larvae are often the most abundant aquatic insect in wetland environments and form a significant portion of the food base for other wildlife (Batzer et al. 1993; Cooper and Anderson 1996; Cox et al. 1998). Laboratory and field studies have shown that Bti is toxic to some larval chironomids, particularly those species which are filter feeders or grazers. Negative impacts on chironomid density/biomass could have deleterious effects on wetland/wildlife food webs and could also lower biodiversity.

In judging the potential for adverse ecological effects of Bti applications, one should consider the non-target aquatic organisms of concern that would be impacted from the potential loss of both mosquito and chironomid larvae. The refuge's mosquito management plan will apply this scientific information for creating the refuge's thresholds for treatment, types of control, and application plans.

The other form of chemical mosquito control is Methoprene, a contact insecticide that does not need to be ingested like Bti (Tomlin 1994). Methoprene products are more toxic than Bti products, killing a wider range of non-target larval insects. This makes Methoprene more likely to cause disruptions to invertebrate food webs. The use of Methoprene as a mosquito larvicide should have no direct adverse effects on populations of endangered birds, mammals, or fish.

Bti (EPA 1998) and Methoprene (EPA 2008) are non-toxic to vegetation; there may be indirect impacts via loss of insect pollinators. However, OMWM excavations have resulted in alteration of the physical structure of refuge salt marsh habitats. Although OMWM reduced the amount of chemicals used for mosquito control, there have been negative impacts to ecosystem function. Inappropriate spoil management has resulted in areas being converted to Phragmites and/or woody vegetation, while other areas can experience excessive draining and lowering of water tables. These conditions resulted in loss of high marsh zones with patches of desirable vegetation of *Spartina patens* being converted to less desirable plants like *Iva frutescens*, *Baccharis halimifolia*, and *Phragmites australis*.

Bti and Methoprene are non-toxic to birds at EPA approved application rates. The extent to which the use of Bti and Methoprene will limit the food resources for individual birds or local avian populations is unknown. IPM strategies will be designed to limit impacts to local invertebrate populations when the mosquito-borne disease risk to humans is low.

In giving full consideration to the protection and integrity of non-target organisms and communities, the greatest concerns the Service has with chronic mosquito chemical use is the potential degradation of biological integrity and diversity and disruption of vital food webs. Larvicides can adversely affect non-target insects, especially chironomids.

The Service's concerns that non-target effects of larvicides and other environmental contaminants could significantly reduce invertebrate populations that are key food resources for waterfowl, shorebirds, fish, and amphibians, have led to additional refuge-specific studies. These studies have provided staff with considerable information about dominant invertebrate taxa present in refuge salt marsh, impounded marsh areas, stable pond environments, and creek habitats from several years of invertebrate community studies (Pinkney et al.1998, Cook and Hill 2000, 2001, McGee et al 2003).

The refuge has no jurisdiction over mosquito control on lands outside the refuge boundary. It is likely that spray drift from mosquito control operations outside of the boundary will enter the refuge from the 3 neighboring barrier island communities. Since the State employs best management practices, and follows the EPA approved label, the Service expects impacts to refuge resources to be minimal.

The Service is proposing to implement a less detrimental pest management strategy for mosquito control that would prevent the use of adulticides until a documented high risk situation occurs. Adulticides (specifically Naled products) are EPA Toxicity Class I (Highly Toxic) general use pesticides. The EPA considers the active ingredient Naled, based on acute toxicity data, to be moderately to highly toxic to birds, moderately toxic to mammals, highly toxic to honey bees, moderately to very highly toxic to freshwater fish, and very highly toxic to freshwater aquatic invertebrates (EPA 2002). The prohibition of the use of adulticides, except in cases of declared health emergency or under the direction of the Secretary of the Interior, would decrease the potential effects on non-target organisms throughout the refuge, particularly invertebrates.

While the estimated increase in costs due to increasing adulticide use off-refuge is 24 percent, the Delaware Mosquito Control Section indicated the potential concern by residents and visitors in the 3 bayfront communities over increased use of pesticides in residential areas. The repeated adulticide applications to maintain mosquito populations at past levels could increase pesticides (adulticide) in the communities by 165 percent. Although DMCS projects a potential increase in adulticide use in populated areas 2.5 times the current rate, DMCS would still adhere to EPA approved application rates.

DMCS states that even with the above mosquito control it may not be able to decrease the adult mosquito population to the same level as with the application of adulticides on the refuge. The size of the resulting adult

mosquito population with the adjusted control measures is unknown. If the adult mosquito population reaches a certain criteria level, it is possible for quality of life and human health protection to decrease. To date, the criteria level has not been defined. It is unknown whether the mosquito population would reach a certain level, in any given year, which would impact the behavior of the surrounding community or its tourist industry. Potential risks to human health include EEE and WNV which are both enzootic/endemic within all areas of Delaware.

There are many potential negative impacts of mosquito management activities that pose threats to the biological integrity, diversity and environmental health of refuge lands and waters, and detract from the conservation of the refuge's resources of concern.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the draft CCP/EIS. Public notification and review include a notice of availability published in the *Federal Register*, a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

General

- Except during declared human health emergencies where actions need to be taken quickly, we must give full consideration to the biological integrity of nontarget populations when considering compatible chemicals used for mosquito control or correcting faulty OMWM systems.
- Habitat manipulations for mosquito management such as draining or maintaining high water levels inappropriate for other wildlife are prohibited, as they conflict with habitat and wildlife management goals and objectives as stated in the CCP and EIS. Exceptions will be made during exigent circumstances, where the Secretary determines it is necessary to temporarily suspend, allow, or initiate any activity on the refuge to protect the health and safety of the public.
- Current mosquito population data obtained from on-refuge monitoring and consideration of the presence of natural mosquito prey species in mosquito breeding areas are necessary before the refuge will allow larvicide treatments for mosquito control on the refuge.
- Re-excavations of current OMWM systems will be allowed once historic and current mosquito breeding data has been evaluated and field reviews have been conducted to assess soil types and other factors that demonstrate probable cause for failure of these systems.

Who does the control?

- DMCS will assume all monetary costs and perform all activities associated with mosquito monitoring, disease surveillance and treatment. Service personnel may accompany DMCS personnel to examine exact locations of heavy mosquito breeding problems to ascertain presence of non-targets and/or mosquito predator species in these areas, as needed.
- Disease surveillance can be conducted adjacent to the refuge to identify existing health threats or document high risk disease situations. Disease surveillance adjacent to the refuge should be within flight range of vector species found on the refuge. DMCS will be responsible to monitor disease activity in reservoir hosts for pathogens or antibodies, and/or collect adult mosquito samples in same-genus pools for virus or any other monitoring it requires to substantiate a high risk disease situation on or near the refuge.

- In the event of a documented risk to human health, the Service will allow DMCS to control mosquitoes on the refuge, per Mosquito Management Plan Protocols, once established, using the least toxic alternatives, including the least toxic adulticides.
- Immediately after any pesticide application, additional mosquito population monitoring will be required to assess the effectiveness of the pesticide treatment(s).
- DMCS should only consider mosquito control treatment in developed areas where humans are present or at the source of nuisance complaints.

Risk Assessment and Mosquito Management Thresholds

- The refuge will collaborate with other Federal and state public health and vector control agencies to identify refuge-specific mosquito-borne disease health threat categories, with corresponding refuge responses. Responses will include intensifying surveillance activities or initiating chemical interventions based on local mosquito population numbers categorized into various threat levels based on disease risk assessments in a decision-making matrix.
- Action thresholds that trigger chemical interventions will incorporate various factors listed in Service Policy 601 FW 7, Exhibit 3 and will be developed with refuge staff, state mosquito control section, public human health services and vector control agencies. Thresholds must be genus and life-stage specific and be related to the refuge decision-making response matrix.
- Numerical action thresholds should be established in collaboration with Federal and State mosquito and public health agencies and identified in the mosquito management plan as shown in 601 FW 7, Exhibit 2.
- All decisions for chemical interventions to control mosquitoes will be based on meeting or exceeding predetermined mosquito abundance and, or disease thresholds.
- Populated areas located off-refuge should be considered for mosquito control treatment before refuge areas.

Chemicals used as Mosquito Control Agents

- The preferred control agents authorized for use are Bti products. Bti is preferred over Methoprene due to its higher insect target specificity, fewer negative impacts on natural mosquito predators, and much lower impacts on other non-target invertebrate species and communities.
- Use of Methoprene will be limited to situations in which Bti products are not sufficient for control of the larval stages present. Only formulations with short term residuals (5-10 days) may be used for larval mosquito control. Use of Methoprene products with long term residuals such as Altosid XR-G, 30-Day Briquettes, or XR Briquettes will not be permitted.
- Adulticides including Naled, may only be used on lands owned and managed by the refuge if there is a declared public health emergency, or as mandated by the Secretary.

Monitoring and Disease Surveillance

- The use of caged sentinel chickens on the refuge for reservoir host surveillance is discouraged due to the risk of spreading disease to wild birds.

Sensitive Areas

- Terms and conditions of the Special Use Permit will be subject to annual modification(s) if disturbance or other impacts are considered to interfere with or detract from the fulfillment of the purposes of the refuge or System mission.

Permits

- Mosquito control will be authorized if needed and requested by DMCS through a Special Use Permit. In addition to operational conditions, permit conditions will stipulate that all chemical use will be carried out in conformance with pre-approved Pesticide Use Proposals and Section 7 Endangered Species consultations.

JUSTIFICATION:

The refuge has worked cooperatively with DMCS to control mosquitoes on Prime Hook NWR since 1963. After a review of these activities, the refuge has determined that continuing some activities of the past would interfere with and materially detract from the mission of the refuge System and purposes of the refuge; and from conserving and protecting focal species and resources of concern as reflected in the refuge’s new goals and objectives identified in the Comprehensive Conservation Plan and EIS.

Eliminating the use of adulticides during low disease risk situations, using Methoprene products conservatively, improves our Integrated Pest Management (IPM) mosquito strategy, reduces negative wildlife consequences and improves the protection and conservation of focal species.

Biological mosquito control in the form of OMWM (limited to existing maintenance) is a more permanent mosquito control technique than chemical interventions and significantly reduces mosquito production. With hundreds of acres of OMWM systems currently in place, significant reduction of mosquito production within most of the refuge’s salt marsh habitats has been documented. Although OMWM reduced the amount of chemicals used for mosquito control, there have been negative impacts to ecosystem function and therefore needs to be evaluated before new areas are considered. Larviciding with BTI is the second most environmentally benign method of controlling mosquitoes, since a relatively small group of insects are susceptible to the toxin. However, the refuge recognizes that Bti exhibits limited efficacy under certain conditions; under those conditions Methoprene would be the prudent alternative.

The use of Bti and Methoprene may receive periodic compatibility review if future studies bring more information to light on the ecological impacts of mosquito control. In addition, new chemicals may become available that could be used on the refuge and would be evaluated at that time for potential use.

The stipulations above address the Service’s laws and System policies to maintain, enhance, and restore biological integrity, diversity, and environmental health, as well as protect the public from unpredictable mosquito-borne health threats.

This activity will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purpose for which the Refuge was established.

SIGNATURE:

Refuge Manager: _____ (Signature) _____ (Date)

CONCURRENCE:

Regional Chief: _____ (Signature) _____ (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE:

Appendix A. Incidence of West Nile and EEE Virus' on the Delmarva Peninsula 2002-2008

		West Nile Virus					Eastern Equine Encephalitis							
		2008					2008							
State	Total Human	Cases	Bird	Total Human Deaths	Mosquito	Sentinel	Veterinary	Total Human	Cases	Bird	Total Human Deaths	Mosquito	Sentinel	Veterinary
DE (statewide)	4	1	4	0	0	18	0	0	0	0	0	0	3	0
MD (eastern shore)	0	1	0	0	0	0	0	0	0	0	0	0	0	0
VA (eastern shore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELMARVA	4	2	4	0	0	18	0	0	0	0	0	0	3	0

		West Nile Virus					Eastern Equine Encephalitis							
		2007					2007							
State	Total Human	Cases	Bird	Total Human Deaths	Mosquito	Sentinel	Veterinary	Total Human	Cases	Bird	Total Human Deaths	Mosquito	Sentinel	Veterinary
DE (statewide)	10	1	10	0	0	20	0	0	2	0	0	0	2	0
MD (eastern shore)	0	1	0	0	0	0	0	0	0	0	0	1	0	0
VA (eastern shore)	0	0	0	0	0	20	0	0	0	0	0	0	0	0
DELMARVA	10	2	10	0	0	20	0	0	2	0	0	1	2	0

Appendix A. Incidence of West Nile and EEE Virus' on the Delmarva Peninsula 2002-2008

		West Nile Virus					Eastern Equine Encephalitis									
		2006					2006									
State	Total Human	Bird	Cases	Total Human	Deaths	Mosquito	Sentinel	Veterinary	Total Human	Cases	Bird	Total Human	Deaths	Mosquito	Sentinel	Veterinary
DE (statewide)	17	0	0	0	0	0	38	1	0	0	0	0	0	0	0	0
MD (eastern shore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA (eastern shore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELMARVA	17	0	0	0	0	0	38	1	0	0	0	0	0	0	0	0
		West Nile Virus					Eastern Equine Encephalitis									
		2005					2005									
State	Total Human	Bird	Cases	Total Human	Deaths	Mosquito	Sentinel	Veterinary	Total Human	Cases	Bird	Total Human	Deaths	Mosquito	Sentinel	Veterinary
DE (statewide)	2	1(2*)	0	0	0	0	4	0	0	0	0	0	0	0	2	1
MD (eastern shore)	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
VA (eastern shore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELMARVA	3	1(2*)	0	0	0	1	4	0	0	0	0	0	0	0	2	1

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Turtle Harvesting (Trapping)

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

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

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

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

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

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

Not Appropriate ___ **Appropriate**

Refuge Manager: _____ Date: _____

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

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

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

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Prime Hook National Wildlife Refuge

Use: Turtle Harvesting (Trapping)

NARRATIVE:

The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) identifies six priority uses of wildlife refuges; environmental education, interpretation, hunting, fishing, wildlife observation and wildlife photography. These priority public uses are dependent upon healthy wildlife populations. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses in planning and management.

Turtle harvesting has occurred on the refuge for many years by a small number of trappers. The activity is not a priority public use, but a general and economic activity, which could be used by the refuge as a management tool. Although some turtle harvesting is for recreation, it clearly has an economic value since the resulting animal is a natural resource that can be bought, sold, or bartered. In contrast, other consumptive uses such as hunting and recreational fishing do not result, due to federal or state law, in a commodity that can be bought or sold. The meat of snapping turtles is considered a delicacy, especially in soup.

COMPATIBILITY DETERMINATION

USE:

Turtle Harvesting (Trapping)

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) “...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds...” {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) “...incidental fish and wildlife-oriented recreational development” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) “the protection of natural resources” {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) “the conservation of endangered or threatened species...” {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is turtle harvesting (trapping), which is primarily an economic (commercial) activity. It is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administrative Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997. Turtle harvesting was deemed compatible in the past (1994) as a management tool to reduce snapping turtle predation of waterfowl, especially ducklings.

(b) Where would the use be conducted?

Turtle harvesting through trapping is an allowable and regulated practice by the Delaware Division of Fish and Wildlife which would be conducted in designated management zones of Prime Hook Creek and Slaughter Creek/Canal. These areas have been historically trapped for turtles.

(c) When would the use be conducted?

The use had been conducted from June 16 through August 31 of each year, which reduced the potential conflict with refuge hunting activities in the fall and winter months. However, conflicts with kayaker/canoers and anglers remained, as Prime Hook Creek is a popular designation for outdoor enthusiasts. The trapping season is considerably shorter than the season established by the Delaware Division of Fish and Wildlife from June 15 through May 15.

(d) How would the use be conducted?

Turtle harvesting follows Delaware State regulations with more restrictive season and refuge regulations issued through a refuge Special Use Permit (SUP). The refuge manager worked with officials of the Delaware Division of Fish and Wildlife to amend the special permit stipulations if warranted by physical conditions of the marsh and population dynamics.

Trappers were required to submit a weekly harvest report during the trapping season. The report would include data about trapping including the number of target and non-target species harvested, the refuge areas trapped, and remarks on the observation of wildlife or other noteworthy ecological information. However, the data is insufficient in determining population trends due to a lack of consistent methodologies. The trapping area is not of a representative size to compare population trends over the years.

(e) Why is this use being proposed?

In previous years, snapping turtle harvesting was considered compatible as a management tool at the refuge to reduce predation on young waterfowl, especially ducks. Some research has shown that the turtle predation has only minor impacts to local populations of waterfowl. Snapping turtles do not appear to be impacting waterfowl populations overall.

The State of Delaware currently has an unlimited harvest quota and an eleven month season which indicates the species as a whole is not in jeopardy in the State of Delaware. Harvesting of snapping turtles has also been a traditional pastime of the area for generations. No information is available on the carrying capacity of the local snapping turtle population or recommended harvestable surplus parameters that would sustain healthy populations of snapping turtles.

AVAILABILITY OF RESOURCES:

The financial resources necessary to provide and administer this use at historic levels are now available, and it is expected these resources would be available in the future. The refuge manager would provide overall administration to the program. A wildlife biologist would be required to evaluate turtle harvesting activity along with current and potential impacts on refuge resources. The biologist would also evaluate trapper data and compile reports. An administrative assistant would process permits. A refuge law enforcement officer would be required to check refuge trappers and ensure compliance with state and federal regulations.

Annual Costs:		
Refuge Manager (GS-12)	2 hrs @ \$50/hr	\$100
Wildlife Biologist (GS-11)	10 hrs @ \$40/hr	\$400
Law Enforcement Officer (GS-9)	40 hrs @ \$30/hr	\$1,200
Administrative Assistant (GS6)	10 hrs @ \$20/hr	\$200
	Total	\$1,900

ANTICIPATED IMPACTS OF THE USE:

Direct impacts of turtle harvesting include mortality of captured individuals and on non-target species such as, other species of turtles. Historical refuge trapping records indicate that approximately 50 to 100 snapping turtles were removed each year and a decrease in snapping turtle populations was not observed. The State of Delaware has an 11 month season and an unlimited harvest quota of snapping turtles. Currently the Delaware Division of Fish and Wildlife does not feel the species is in jeopardy and therefore has no objections to the activity on the refuge (personal communications with Holly Neiterrider, DNREC 2009) especially with the abbreviated season

being proposed. No information is available on the carrying capacity of the local snapping turtle population or recommended harvestable surplus parameters that would sustain healthy populations of snapping turtles. No impact to endangered species is anticipated.

Indirect impacts may include displacing migratory birds resting and feeding in the marshes and are expected to be negligible due to the low number of permitted trappers. Conflict with priority wildlife-dependent recreational activities, particularly on Slaughter Canal and Prime Hook Creek. Affected user groups include canoers/kayakers, anglers, wildlife observers, and photographers who will be using these same areas. .

Turtle harvesting in the proposed areas do not pose any threat to historic properties on and/or near the refuge.

Our findings indicate that there is insufficient knowledge pertaining to the target species, data, and associated research to assess cumulative impacts on wildlife resources or their habitats.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the draft Prime Hook CCP/EIS. Public notification and review include a notice of availability published in the *Federal Register*; a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

Use is not compatible

Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

n/a

JUSTIFICATION:

The National Wildlife Refuge System Improvement Act of 1997 enumerated six wildlife-dependent recreational uses of refuges that are considered priorities for the Refuge System. All other recreational uses are now considered general uses. Appropriate Use Policy 603 FW1 states “General public uses that are not wildlife-dependent recreational uses (as defined in the Improvement Act) and do not contribute to the fulfillment of refuge purposes, or goals, or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from the responsibilities to protect and manage fish, wildlife, and plants and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the Refuge System.”

The above-referenced activity is not a priority public use, but a general and economic activity, which could be used by the refuge as a management tool if warranted. Although some turtle harvesting is for recreation, it clearly has an economic value since the resulting animal is a natural resource that can be bought, sold, or bartered. In contrast, other consumptive uses such as hunting and recreational fishing do not result, due to federal or state law, in a commodity that can be bought or sold. The meat of snapping turtles is considered a delicacy, especially in soup (White, Jr. & White 2002).

Turtle harvesting provides a minimal benefit as a waterfowl management tool. Common snapping turtles have been historically thought to be detrimental to fish and waterfowl populations by predation; however, more studies are finding that their negative impact on waterfowl populations are exaggerated (White, Jr. & White 2002). Past studies of the eating habits of snapping turtles have reported the frequency of occurrence of waterfowl in the

stomach contents of these turtles to be low, ranging from 5.5% to 27% using small sample sizes (e.g., Pell, 1940; Lagler, 1943; Coulter, 1957; Hammer, 1969). Another study (Alexander 1943), which used a larger sample size, reported very low occurrence of birds, including the wood duck, in the stomach contents of snapping turtles. Coulter (1957) found that up to 13 percent of the estimated duckling population was taken by snapping turtles in Maine.

These previous studies only looked at the percent of waterfowl in the stomachs of turtles and not at the predation rate, or proportion of waterfowl ducklings preyed on by turtles. More current research conducted by Kenow et al. (2009) on the Upper Mississippi River found that the predation rate of snapping turtles on waterfowl, particularly ducklings, is minimal (2.9%) and that the predation rate of reptiles (14.2%) was lower than mammals (31.7%) and similar to that of fish (9.2%) and birds (11.7%). Abel (1992) reported attacks of snapping turtles on swan cygnets of seven to 15 pounds on Wisconsin lakes and concluded non-fatal attacks by these turtles likely cause injuries to many birds that later become infected or incapacitated.

Concerns have been raised about the effect of harvesting on snapping turtle populations and breeding size adults (Zappalorti 1995). Preliminary research in Maryland has shown that commercial harvest of snapping turtles may impact their population size structure, which could negatively affect their survivability due to life history characteristics of extended age to maturity, low annual fecundity, and low hatchling survival (Chesapeake Marshlands National Wildlife Refuge Complex Sixth Annual Science Meeting 2009).

Conclusion: Due to insufficient population data relating to the harvestable surplus of Delaware's snapping turtle population and numerous studies that support minimal predatory impacts to birds from snapping turtles, the use of turtle harvesting on the refuge is not justified as a management tool or economic use to support the refuge purpose, System mission, or refuge goals and objectives. Compatibility may be reconsidered in the future if 1) research provides new evidence that snapping turtle predation is a significant detriment to migratory birds or refuge trust resources and 2) the Delaware Division of Fish and Wildlife identifies parameters for the carrying capacity of our local snapping turtle population and a recommended harvestable surplus that sustains a healthy population of snapping turtles.

This activity will materially interfere with and detract from the mission of the Refuge System and purposes for which the refuge was established. In addition, this activity will not fulfill one or more purposes of the refuge or the Refuge System. This use is not consistent with any approved refuge management plan. The use of turtle harvesting is, therefore, determined to be not compatible with current information.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: _____

LITERATURE CITED:

See CCP Bibliography.

COMPATIBILITY DETERMINATION

USE:

Federal Aviation Administration (FAA) Vortac Tower

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

This compatibility determination is for the continuation of an ongoing use. The Federal Aviation Administration (FAA) Radar Tower, which is an air navigational aid known as Waterloo, Delaware VORTAC, is located in Tract 79c of the refuge. The tower was erected in 1957 and was operated by FAA under a lease agreement with the landowner, Island Farm, Inc. In 1968, the Service acquired the land from Island Farms, Inc. and has managed this facility with a Special Use Permit (SUP) that is renewed every five years.

The tower consists of a small building of approximately 1,400 square feet. The enclosed building houses electronic equipment which provides a signal beacon used for aircraft navigation. FAA personnel make infrequent trips to the site for on-site maintenance. The SUP authorizes FAA personnel to maintain and operate the buildings, roads, power lines, drains, and other components of the complete Waterloo, Delaware VORTAC that was in place on the ground when title to the land involved passed to the United States Government.

To help minimize environmental impacts and ensure compatibility with the purposes for which the refuge was established and the mission of the National Wildlife Refuge System, environmental stipulations are to be included in the SUP.

AVAILABILITY OF RESOURCES:

Adequate refuge personnel and base operational funds are available to manage this activity at current levels. Staff time primarily involves monitoring use to ensure compliance with permit stipulations. The FAA provides personnel to operate and maintain the tower. Refuge staff maintains the roadway leading from State Route 16 to the tower; however, snow removal is the responsibility of FAA. FAA maintains the grounds upon which the tower is located, using Service approved herbicides.

ANTICIPATED IMPACTS OF THE USE:

On-site visits by FAA personnel may disturb feeding geese during the period from October to March and may disturb nesting osprey from March to July. The birds are expected to habituate or return to feeding/nesting once the vehicle has passed. (Klein 1993). Impacts to natural resources from this activity at present levels are expected to be negligible.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the refuge's Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*, a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- 1) The permittee is responsible for ensuring that all employees, party members, contractors, and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of the permit.
- 2) Fuel caches are prohibited.
- 3) The use of off road vehicles is prohibited.
- 4) No toxic materials will be used or stored on the facility site except as required for maintenance and operation of the permit facility and approved in advance by the refuge manager.
- 5) Permittee shall exercise reasonable care as determined by the refuge manager in using toxic materials if such materials are required for the proper and safe operation of the permitted site.
- 6) Only pesticides approved by the Service may be used. A pesticide use request must be submitted by March 1 of each year.
- 7) The access gate to the unit must be closed and locked during entry/exit from the refuge. The lock on the gate to the unit will be provided by the Service.
- 8) Vehicle speed limit shall not exceed 25 M.P.H. on Service lands.
- 9) The Service may regulate public access and egress to the general area in which this unit is located.

- 10) No new construction or any changes, above the physical base which was in place when the US Fish and Wildlife Service purchased the property, may occur without approval of the Regional Director.
- 11) The refuge manager may require permit modifications at any future time to ensure that the use and occupancy of the land is compatible with the purposes for which the refuge was established and the mission of the National Wildlife Refuge System.
- 12) Refuge staff will periodically monitor the site, and findings from these monitoring efforts will be used to determine what additional management actions, if any, are needed to ensure permitted activities remain compatible with the purposes for which the refuge was established and the mission of the National Wildlife Refuge System.
- 13) The permit may be terminated at any time by mutual agreement.

JUSTIFICATION:

This compatibility determination is a reevaluation of an existing use. After fully considering the impacts of this activity, as described previously in the “Anticipated Impacts” sections of this compatibility determination, this permit will not materially interfere with or detract from the mission of the Refuge System or the purpose for which the refuge was established.

This use is important to public safety and to national security as being an important link in the Nation’s aircraft navigation system. The refuge will evaluate this compatibility determination if conditions under which the use is permitted change significantly, if there is significant new information regarding the effects of this use or upon renewal of the permit in five years.

SIGNATURE:

Refuge Manager: _____ (Signature) _____ (Date)

CONCURRENCE:

Regional Chief: _____ (Signature) _____ (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE:

COMPATIBILITY DETERMINATION

USE:

Recreational Fresh & Saltwater Fishing & Crabbing

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715d}
- (2) Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

- (1) "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
- (2) "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (3) "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (4) "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is recreational fresh and saltwater fishing and crabbing, which is one of six priority public uses identified by Executive Order 12996 (March 25, 1996) and by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

Fishing for bait fish is permitted for recreational uses only, subject to regulations stated in Title 7 (Conservation) of the Delaware State Code. Recreational crabbing using collapsible traps is permitted from the shoreline only and the owner must be present.

(b) Where would the use be conducted?

The use would be conducted within the refuge's 10,132 acres, which lie between Slaughter Beach and the Broadkill River along the southeastern coastline of Delaware. Refuge waterways currently provide habitat for freshwater fish species such as largemouth bass, crappie, pickerel, and sunfish, for brackish water fish species such as white perch and striped bass, and for saltwater species, such as weakfish, flounder, striped bass, croaker, spot, and bluefish.

The refuge will open to public fishing in compliance with state and federal regulations. Below is a description of the specific areas open for each type of fishing opportunity. See Map 4-15 for an illustration of where fishing and crabbing would be conducted on the refuge.

<u>Area</u>	<u>Type of Access</u>
Fowler Beach	Shore only
Slaughter Canal	Boat & shore
Slaughter Creek	Shore only
Prime Hook Creek	Boat only (Shore only at HQ Canal)
Turkle & Fleetwood Ponds	Boat & shore
Goose & Flaxhole Ponds	Boat only
Petersfield Ditch	Shore only

(c) When would the use be conducted?

Fishing and crabbing would take place within the open fishing and crabbing seasons established by the Delaware Division of Fish and Wildlife. Fishing is practiced year-round except when waterways are frozen. Crabbing occurs primarily during the period from June through October. The refuge is open one-half hour before sunrise to one-half hour after sunset except night fishing is permitted at Fowler Beach. All boats must be off of the water at sunset. Fishing would be prohibited during designated seasonal closures, which are described in the following section.

(d) How would the use be conducted?

Fishing/crabbing will be conducted during the State of Delaware’s fishing/crabbing seasons, in accordance with federal and state regulations. Federal regulations in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as existing, refuge-specific regulations will apply. However, the refuge manager may, upon annual review of the fishing program and in coordination with the Delaware Division of Fish and Wildlife, impose further restrictions on fishing, recommend that the refuge be closed to fishing, or further liberalize fishing regulations within the limits of state seasons and regulations. Fishing would be restricted if it becomes inconsistent with other, higher priority refuge programs or endangers refuge resources or public safety.

Crabbing will be conducted using only hand lines and collapsible traps. Collapsible traps must be fished from the shore only and the owner must be present. All other types of crabbing equipment are prohibited.

The refuge will consider crabbing along Prime Hook Road, Broadkill Road, and Fowler Beach Road in the future if visitor safety and adequate parking can be guaranteed.

Public access to the refuge can be gained from Route 1 along several State roads including Broadkill Beach Road, Deep Branch Road, Prime Hook Road, Cods Road, Fowler Beach Road, and Slaughter Beach Road. Anglers must access refuge lands from designated access points. Motorized or mechanized vehicles, such as off-road vehicles, are not allowed on refuge property.

A description of the fishing program is listed below and contains refuge-specific regulations:

In addition to published 50CFR regulations and State regulations, refuge-specific regulations also apply for Recreational Fishing and Crabbing and are below as follows:

- 1) No refuge-specific permits are required, except for night fishing at Fowler Beach.
- 2) No boat launching fees are required.
- 3) The refuge is open to fishing ½ hour before sunrise to ½ hour after sunset except night fishing is permitted at Fowler Beach. All boats must be off the water at sunset.

- 4) Catch and release regulations apply, including mandatory use of barbless hooks, for Turkle Pond, Fleetwood Pond, Goose Pond, Flaxhole Pond, and Prime Hook Creek.
- 5) Seasonal closures
 - a) Designated beach dunes and overwash areas will be closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.
 - b) Western Prime Hook Creek (from old shop ramp to Waples Pond): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - c) Goose and Flaxhole Ponds and Eastern Prime Hook Creek (from old shop ramp to HQ ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - d) Turkle and Fleetwood Ponds (in HQ Area): Closed only for a limited number of days for deer hunts.
 - e) Slaughter Canal (boat access): Except for Sundays, closed from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - f) Water Control Structures at Petersfield Ditch & Slaughter Canal & Cods Road (shore only): Open year round.
- 6) Boats are not allowed at Slaughter Creek and Petersfield Ditch. Boats must be ported in by foot from the parking areas to Goose and Flaxhole Ponds.
- 7) Boat motor restrictions:
 - a) 30 horsepower motor restriction on Prime Hook Creek and Slaughter Canal
 - b) Electric motors or manual propulsion only on Turkle & Fleetwood Ponds
 - c) Manual propulsion only on Goose & Flaxhole Ponds (includes float tubes)
 - d) Air thrust boats and jet skis are not permitted
 - e) A “Slow No Wake” zone of one-half mile has been established on the Headquarters Ditch.
- 8) Restriction of bank fishing (where permitted) to designated area off of state maintained highways at Petersfield Ditch, Slaughter Creek, and Slaughter Canal.
- 9) Access at Fowler Beach will only occur on refuge owned lands on the sandy part of the beach from the toe of the dunes to the Delaware Bay (mean high water demarcation to mean low water demarcation). One parking lot with a dune crossover provides access to the beach. Access on the dune and adjacent marshes is prohibited.
- 10) Crabbing will be conducted using only hand lines and collapsible traps. Collapsible traps must be fished from the shore only and the owner must be present. All other types of crabbing equipment are prohibited.
- 11) Areas may be closed on the refuge without warning.
- 12) A wheelchair accessible fishing pier on Fleetwood Pond is available for disabled anglers.
- 13) Camping and open fires are prohibited.

- 14) Harvest information is not required.
- 15) No check in/out required.
- 16) Dog walking is not permitted on the refuge.
- 17) Recreational gill netting, commercial fishing, and food fishing with equipment other than hook and line are prohibited on the refuge.

(e) Why is this use being proposed?

Fishing is one of the priority public uses defined by Executive Order 12996 (March 25, 1996) and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). This legitimate and appropriate use of a National Wildlife Refuge is generally considered compatible, as long as it does not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the National Wildlife Refuge.

The Service intends to continue the tradition of wildlife-related recreation on the refuge by allowing fishing/crabbing in compliance with state regulations. By allowing this use to continue, anglers can experience this traditional recreational activity, gain a better appreciation of the refuge’s high quality habitats, and become better informed about the refuge and the National Wildlife Refuge System.

AVAILABILITY OF RESOURCES:

Permitting the use of recreational fishing/crabbing is within the resources available to administer our Visitor Services Program with the current level of participation and to ensure that the use remains compatible with the refuge purposes. Additional funding for visitor services improvements can also come from challenge cost share projects, grant funds, and contributions. Compliance with fishing regulations is handled within the regular duties of the Station Law Enforcement Officer.

Facilities or materials needed to support this use include maintaining access roads, parking areas, and the wheelchair accessible fishing pier; upgrading some of the existing boat launching areas, providing fishing information in the public use brochure, maintaining the refuge’s website with current refuge fishing information, maintaining regulatory and interpretive fishing program signs, and monitoring of the fisheries at Prime Hook Creek, Fleetwood Pond, Turkle Pond, Goose Pond, and Flaxhole Pond. Costs associated with the Public Fishing Program are estimated below. Costs associated with fisheries assessments and monitoring will be a one-time cost that may need to be conducted every five years and is not included in the annual cost of the fishing program below.

Item	PROPOSED	
	Staff Days	Cost
Planning	1	\$300
Printing costs-handouts	0.25	\$75
Law Enforcement	1.5	\$360
Inquiries	1.5	\$300
Facilities maintenance supplies*	0	\$0
Fishing operations (youth fishing tournament)	1	\$350
Total	5.25	\$1,385

*Maintenance of parking lots, boat ramps, etc., is covered by deferred maintenance projects. Access roads and trails are already maintained for management access or other recreational uses.

ANTICIPATED IMPACTS OF THE USE:

For a more complete analysis of the impacts of recreational fresh and saltwater fishing and crabbing, refer to chapter 5 of the CCP/EIS.

Anglers are expected to use and stay on hiking and canoe trails or roads to access the interior of the refuge. Designated areas, such as fishing areas off of state maintained highways, are established to reduce impacts to refuge resources. Facilities most utilized by anglers are roads, parking lots, trails, and boat launching ramps. Maintenance or improvement of these facilities will cause negligible short-term impacts to localized soils and waters and may cause some wildlife disturbances and damage to vegetation.

Fishing activities directly related to refuge operations would generate an estimated \$198.5 thousand in local output, 2.0 jobs, and \$55.4 thousand in labor income in the local economy (see appendix I in CCP). Including direct, indirect, and induced effects, fishing activities would generate an estimated total economic impact of \$277.8 thousand in local output, 2.3 jobs and \$79.4 thousand in labor income. Recreational fishing and crabbing is expected to have negligible short-term, long-term or cumulative impacts on the economy of the towns or county in which the refuge lies. This activity would not considerably alter the demographic of economic characteristics of the local community. Additionally, Impacts on cultural resources are expected to be negligible based on our observations of past fishing impacts.

Recreational fishing and crabbing are expected to have negligible adverse short-term, long-term or cumulative impacts on local or regional air quality and vegetation.

Recreational fishing and crabbing are expected to have negligible adverse short-term, long-term or cumulative impacts on soils. Increased soil compaction will increase on heavily used shoreline areas for boat access in Goose and Flaxhole Ponds. To minimize impacts on bank erosion, no wake zones and a maximum motor restriction of 30 horsepower on Prime Hook Creek and Slaughter Canal will be posted.

Recreational fishing and crabbing are expected to have negligible adverse short-term, long-term or cumulative impacts on hydrology or water quality based upon staff observations of past fishing impacts. The use of boats by anglers has the potential to affect water quality negatively by increasing erosion, stirring up bottom sediments, or introducing pollutants into waterways. We do not expect emissions from vehicles or boat motors to substantially affect the water quality of the region.

Regarding state and Federally listed endangered species, impacts on the piping plover, American oystercatcher, common tern, Forster's tern, and least tern will be minimized through the seasonal closure of designated beach dunes and overwash areas from March 1 through September 1. A Section 7 Evaluation has been conducted as part of this review and it was determined that proposed activities would not likely affect the Delmarva fox squirrel.

During the period of September 1 – March 15, which is when most wintering and migrating waterfowl are on the refuge, adverse impacts to migrating and wintering waterfowl could result from unregulated human disturbance in optimum waterfowl habitats at the refuge. This conclusion is based on the role of disturbance as it relates to waterfowl life history requirements and behaviors such as feeding, flight, metabolic processes, molting, preening, and resting. Excess disturbance may negatively affect the ability of waterfowl to secure nutrients, thus disrupting molting processes and associated reproductive strategies. Adverse impacts to preening activities would be similar to those associated with the molting process. To minimize waterfowl disturbance from fishing and other recreational uses, the refuge has designated approximately 3,000 acres as waterfowl sanctuaries that will be closed to hunting and other recreational use on a seasonal or annual basis.

Recreational fishing and crabbing are expected to have negligible adverse short-term, long-term or cumulative impacts on shorebirds and landbirds.

Impacts on secretive marsh and waterbirds are expected to be negligible. An increase in new fishing areas and associated hiking trails, particularly in or near wetland areas, have the potential to increase disturbance to secretive marsh and waterbirds. We anticipate that in the winter public use at these locations would be negligible.

A potential direct negative impact exists for wetland and open waterbird species (such as osprey, herons, and waterfowl) from lost fishing gear: specifically, hooks, lures, and litter; or becoming entangled in fishing line or hooks. Ingestion of lead sinkers is another source of concern throughout the region. The extent to which these bird species are impacted by fishing tackle currently is unknown. Discarded fishing line and other fishing litter can entangle migratory birds and marine mammals and cause injury and death

The activities described in this determination should have no long-term impact on mammal use of the refuge. In general, the presence of humans will disturb most mammals, which typically results in a temporary displacement without long-term effects on individuals and populations. We expect indirect impacts to mammals to increase

due to proposed expansions in public use activities such as fishing. Additionally, impacts to invertebrates such as butterflies, moths, other insects, and spiders are expected to be negligible.

Fishing, which is one of the six priority wildlife-dependent public uses, is a consumptive activity with additional direct effects on fisheries resources. Fishing has also been evaluated for its potential to benefit or adversely affect amphibians and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Disturbance to basking or nesting turtles may occur where public use is concentrated at points where land and water interface.

Increasing fishing opportunities on the refuge would serve the demand for more fishing opportunities in Sussex County. The improved habitat quality resulting from ongoing habitat restorations on the refuge would likely result in improving water quality and increasing some fish populations. That could positively affect the fishing experience and fishing success.

Expanding fishing opportunities are expected to have adverse impacts on a certain segment of the public that does not desire any change in public use programs and regulations, or that may hold differing views on the course of action. In addition, while new visitors become familiar with those changes, violations could increase. Some conflict between wildlife observers, photographers, students, and other refuge users is expected to result in short-term moderate adverse impacts, which will be managed through seasonal closures. Fishing is also a relatively quiet form of wildlife-recreation that should have negligible impact on visitors participating in other activities such as wildlife observation or photography.

Minimal infrastructure, which includes the addition of two to three parking areas, enhancement of existing boat ramps, and placement of informational signs, is anticipated in support of this priority public use. There would be some minimal costs associated with these programs in the form of road maintenance, law enforcement, and boat ramp maintenance.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the refuge's Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*; a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage the fishing/crabbing program in accordance with Federal and State regulations and review it annually to ensure fisheries/wildlife and habitat goals are achieved and that the program is providing a safe, high quality fishing experience for participants. The refuge based these stipulations on our past Environmental Assessment on Fishing, 1986 Fishing Plan, draft CCP and Environmental Impact Statement, and refuge-specific regulations (See Description of Use section).

To ensure compatibility with refuge purposes and the mission of the Refuge System, fishing can occur on the refuge if the refuge-specific regulations highlighted in this document and following stipulations are met:

- 1) This use must be conducted in accordance with state and federal regulations (50CFR), and special refuge-specific regulations published in the Public Use Regulations brochures.
- 2) The fishing program will be reviewed annually to ensure that program contributes to refuge objectives in managing quality fisheries and recreational fishing and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats.

- 3) The refuge manager may, upon annual review of the fishing program and in coordination with the Delaware Division of Fish and Wildlife, impose further restrictions on fishing, recommend that the refuge be closed to fishing, or further liberalize fishing regulations within the limits of state seasons and regulations. Fishing may be restricted if it conflicts with other, higher priority refuge programs or endangers refuge resources or public safety.
- 4) Fishery assessments will be conducted in Turkle Pond, Fleetwood Pond, Goose Pond, Flaxhole Pond, and Prime Hook Creek to provide management recommendations if necessary (seasonal closures, stricter creel or size limits, etc.). Goose and Flaxhole Ponds will remain closed until these fishery assessments and contamination surveys are completed.
- 5) Closure of all side branches off Prime Hook Creek and freshwater ponds not specifically open to fishing.
- 6) Restriction of bank fishing (where permitted) to designated areas off of state maintained highways at Petersfield Ditch, Slaughter Creek, and Slaughter Canal.
- 7) Catch and release regulations will apply, including mandatory use of barbless hooks, for Turkle Pond, Fleetwood Pond, Goose Pond, Flaxhole Pond, and Prime Hook Creek.
- 8) Public outreach and education will be increased in order to minimize conflicts between user groups, help control aquatic invasive species, reduce fish introductions, and minimize disturbance to wildlife and habitat.
- 9) Refuge Law Enforcement Officer(s) will promote compliance with Refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Refuge Law Enforcement personnel will monitor all areas and enforce all applicable state and federal regulations.
- 10) Designated seasonal closures must be followed to minimize conflict among user groups and minimize wildlife disturbance:
 - a) Designated beach dunes and overwash areas will be closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.
 - b) Western Prime Hook Creek (from old shop ramp to Waples Pond): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - c) Goose & Flaxhole Ponds & Eastern Prime Hook Creek (from old shop ramp to HQ ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - d) Turkle & Fleetwood Ponds (in HQ Area): Closed only for a limited number of days for deer hunts.
 - e) Slaughter Canal (boat access): Except for Sundays, closed from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - f) Water Control Structures at Petersfield Ditch & Slaughter Canal & Cods Road (shore only): Open year round.
- 11) Changes outlined in the CCP dealing with closed and seasonally closed areas and fishing regulations, when approved, will be incorporated into their respective fishing program.
- 12) Recreational gill-netting, food fishing with equipment other than hook and line, and all commercial fishing are not permitted.

13) Crabbing will be permitted using only hand lines and collapsible traps. Collapsible traps must be fished from the shore only and the owner must be present. All other types of crabbing equipment are prohibited.

JUSTIFICATION:

Fishing is a priority wildlife-dependent use for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and The National Wildlife Refuge System Administration Act of 1966, as amended by 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 ensure that they receive enhanced attention during planning and management.

Fishing seasons and limits are established by the State of Delaware and adopted by the refuge. These restrictions ensure the continued well-being of overall populations of fish. Fishing does result in the taking of many individuals within the overall population, but restrictions are designed to safeguard adequate population and recruitment from year to year. Specific refuge regulations address equity and quality of opportunity for anglers, and help safeguard refuge habitat. Disturbance to other fish and wildlife does occur, but this disturbance is generally short-term and adequate habitat occurs in adjacent areas. Loss of plants or increases in water turbidity from boat motors is minor, or temporary, and is generally not concentrated since fishing pressure is well distributed.

Conflicts between anglers are localized and are addressed through law enforcement, public education, and continuous review and updating to State and refuge fishing regulations. Conflicts between other various user groups are further reduced by the establishment of seasonal area closures and by prohibiting recreational gillnetting, food fishing with equipment other than hook and line, commercial fishing, and crabbing with equipment other than hand lines and collapsible traps.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the National Wildlife Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the Refuge.

This activity will not materially interfere with or detract from the mission of the Refuge System or the purpose for which the refuge was established.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: _____

COMPATIBILITY DETERMINATION

USE:

Hunting

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

1. Migratory Bird Conservation Act {16 U.S.C. 715d}
2. Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

1. "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
2. "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
3. "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
4. "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is the public hunting of white-tailed deer, upland game (rabbit, quail, pheasant, and red fox), turkey, webless migratory birds (dove, woodcock, and snipe), and waterfowl (including coot) on the refuge. Hunting was identified as one of six priority public uses by Executive Order 12996 (March 25, 1996) and by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

Quality opportunities for hunting deer, waterfowl, upland game, and webless migratory birds, and turkey will be expanded, where possible, to include additional days and acres. Deer hunting would increase from 3,876 to 5,389 acres, waterfowl hunting from 1,723 to 3,455 acres, upland game & migratory bird hunting remains at 1,957 acres, and turkey hunting would expand from zero to 3,472 acres. For a detailed explanation of the history of the refuge's hunting program, refer to "Hunting Opportunities" in the "Refuge Visitor Services Program" section in Chapter 3 of the refuge's CCP and to the "Description of the Hunting Program" in the refuge's Hunting Management Plan.

(b) Where would the use be conducted?

The use would be conducted within the refuge’s 10,132 acres, which lie between Slaughter Beach and the Broadkill River along the southeastern coastline of Delaware. A total of 5,389 acres would be open for deer hunting, 3,455 acres open for migratory bird hunting, 1,957 acres open for upland game hunting, and 3,472 acres open for wild turkey hunting. Forty percent of the refuge (3,455 acres) is open to migratory bird hunting, which is the maximum amount of land allowed by law (16 U.S.C. 668dd(d)(1)(A), National Wildlife Refuge System Administration Act; 16 U.S.C. 703-712, Migratory Bird Treaty Act; and 16 U.S.C. 715a-715r, Migratory Bird Conservation Act). Below is a description of the specific areas open for each type of hunting opportunity. See Map 4-16, 4-17, 4-18, 4-19 for an illustration of where hunting would be conducted on the refuge.

Area	Species	Acres	Seasons***
Regular Deer Hunt Area	Deer	3,939	Sept-Feb
Regular Waterfowl Hunt Area	Waterfowl & Dove	2,100*	Sept- Feb
Lottery Waterfowl Hunt Area	Waterfowl	1,338*	Sept-Feb
Lottery Deer Hunt Area	Deer	751	Nov & Jan
Non-Ambulatory Hunt Area	Deer & Waterfowl	16**	Sept-Feb
Lottery Non-Ambulatory Deer Hunt Area	Deer	682	Oct & Nov
Upland Game Hunt Area	Upland game & webless migratory birds (1,847 acres) except where designated as closed (110 acres)	1,957	Sept-Feb
Lottery Turkey Hunt Area	Turkey	3,471	Apr-May
Snow Goose Conservation Order	Snow Geese	Refuge-wide****	Late Jan - April

* A total of 3,454 acres is open to migratory bird hunting. This is the maximum amount of land allowed by law (40% rule). Lands purchased with Land and Water Conservation Funds do not apply.

**Acres included as part of Lottery Waterfowl Hunt Area

***Follow State hunting seasons that include seasonal closures and time restrictions (see hunting objectives and strategies in this section for more information)

****40% rule does not apply because taking of snow geese in the conservation order has been determined to be beneficial to the species.

(c) When would the use be conducted?

The use would be conducted in designated areas of the refuge in accordance with federal and state regulations. Hunting would take place within the open hunting seasons established by the Delaware Division of Fish and Wildlife.

(d) How would the use be conducted?

Hunting will be conducted during the State of Delaware’s hunting seasons, in accordance with federal and State regulations. Federal regulations in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as existing, refuge-specific regulations will apply. However, the refuge manager may, upon annual review of the hunting program and in coordination with the Delaware Division of Fish and Wildlife, impose further restrictions on hunting, recommend that the refuge be closed to hunting, or further liberalize hunting regulations within the limits of state seasons and regulations. We may restrict hunting if it conflicts with other, higher priority refuge programs or endangers refuge resources or public safety.

Seasonal closures to the general public will occur during the hunting season, which is typically a slower period of use due to weather conditions, and are highlighted below:

- a) Western Prime Hook Creek (from old shop ramp to Waples Pond) (Unit III): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- b) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp) (Unit III): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- c) Headquarters Area (includes Turkle & Fleetwood Ponds) (Unit III): Closed only for a maximum of two days for deer hunts.
- d) The northern portion of Unit IV (includes trail overlooking Vergie’s Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- e) Hiking Trails on Fowler Beach Road (Unit I), Prime Hook Road (Unit III), and Slaughter Beach Road and Slaughter Canal (Unit I): Closed on Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.

The refuge will also evaluate the regular deer hunting area for the potential to incorporate hunting opportunities for non-ambulatory hunters.

Public access to the refuge can be gained from Route 1 along several State roads including Broadkill Beach Road, Deep Branch Road, Prime Hook Road, Cods Road, Fowler Beach Road, Turkle Pond Road, and Slaughter Beach Road. Hunters must access refuge lands from designated access points. No motorized or mechanized vehicles, such as off-road vehicles, are allowed off of designated roadways or parking areas on refuge property.

Boats would enter refuge waters from unimproved access points on Slaughter Canal at Fowler Beach Road and on Prime Hook Creek at either Waples Mill Pond on the Brumbley Family Campground, at the office boat ramp, or at the ramp at the old maintenance facility. All boaters are required to operate their craft and possess all safety equipment in accordance with Delaware State and U.S. Coast Guard Regulations.

The refuge will evaluate the future management of the Prime Hook Wildlife Area, which is managed and owned by the Delaware Division of Fish and Wildlife. In the past, refuge staff have issued hunting permits and collected fees for the Prime Hook Wildlife Area’s eight waterfowl blinds through the refuge’s waterfowl hunting permitting system. Currently, a contractor handles the collection of fees and issuance of permits. A formal agreement such as a MOU needs to be established if future cooperative management occurs. For more information about the partnership between the refuge and the Delaware Division of Fish and Wildlife as it relates to the Prime Hook Wildlife Area, refer to “Hunting Opportunities” in the “Refuge Visitor Services Program” section in Chapter 3 of the refuge’s CCP and to the strategies section in the “Description of the Hunting Program-Objective 5.1” in the refuge’s Hunting Management Plan.

Descriptions of each of the hunting programs are listed below and contain refuge-specific regulations:

General Regulations for All Hunting Programs

- 1) All hunters must have in their possession a signed and current refuge hunting permit. Except for lottery hunt areas, permits are available beginning in July through the hunting season. Permits are available at the refuge check station, refuge office, refuge website, or upon request from the refuge manager. For lottery hunts, a preseason lottery drawing will be conducted to issue permits and collect fees.
- 2) No permit fees are required except for lottery hunts for deer, turkey, and waterfowl. For these hunts, a \$5.00 application fee for the preseason lottery drawing is required. In addition, a daily permit fee of \$10.00 for turkey and deer hunting, and a \$15.00 fee for waterfowl hunting are required. Everyone in the lottery drawing has an equal chance of being selected multiple times.

- 3) Vacancies remaining after the preseason lottery drawing is complete, will be available throughout the hunting season. For these vacancies, the daily permit fees plus a processing fee of \$2-3 per hunt. Hunters will be allowed to claim only one permit per day to avoid someone from claiming all available vacancies at one time. The 50% discount on permit fees to Interagency Senior and Access passholders does not apply.
- 4) Non-ambulatory hunters (those hunters permanently confined to a wheelchair) must obtain an Interagency Access Passport, which provides a record of certified disability, to be eligible to receive a hunting permit for the designated non-ambulatory hunting areas.
- 5) Youth hunters aged 15 years and younger must obtain a free seasonal permit. Only hunters aged 16 years and older can apply or obtain a lottery hunt area permit.
- 6) The refuge will not provide permanent hunting structures except for non-ambulatory hunting activities. Hunting blinds/stands/steps must be portable and removed at the end of each day.
- 7) Hunters may not be on the refuge any earlier than two hours before the morning shooting time.
- 8) Areas may be closed on the refuge without prior warning.
- 9) The maximum permitted motor on refuge waterways is 30 horsepower.
- 10) No vegetation may be cut on the refuge (e.g., for shooting lanes, camouflaging, etc.).
- 11) The use of natural vegetation for camouflaging your blind is prohibited.
- 12) Practice or target shooting on the refuge is prohibited.
- 13) Overnight camping and open fires are prohibited.
- 14) No hunting is permitted in designated safety zones.
- 15) When requested by federal and State enforcement officers, hunters must display all game, hunting equipment, and ammunition for inspection.
- 16) Permits are non-transferable.
- 17) Individuals assisting non-ambulatory deer hunters in the non-ambulatory hunting area are not permitted to hunt; however, up to two individuals may hunt while assisting a non-ambulatory waterfowl hunter.
- 18) Submission of harvest information to refuge staff is not required.
- 19) For the Statewide youth hunts, all designated hunt areas will be open for waterfowl and deer hunting on a first-come, first-served basis.
- 20) All boaters are required to operate their craft and possess all safety equipment in accordance with Delaware State and U.S. Coast Guard regulations.
- 21) Non-toxic shot is required for all hunting except for lead slugs for deer/fox hunting.
- 22) The refuge manager will monitor, evaluate, and make necessary adaptations to the hunting program to ensure that the refuge is meeting resource management objectives and continuing to offer quality experiences. The refuge manager has the authority to extend or close hunting opportunities on the refuge within the established hunting seasons of the Delaware Division of Fish and Wildlife, while ensuring compatibility.

Regulations for Deer Hunting

- 1) Free-roam hunting is available on a first-come, first-served basis everyday during the State hunting seasons in the Regular Deer Hunting Area with the following restrictions:
 - a) No access by canoe from Slaughter Creek on Cods Road.

- b) The designated area north of Prime Hook Road will be seasonally closed from the Monday before Thanksgiving through March 15.
 - c) In the designated area along Prime Hook Creek, hunting is permitted during designated State deer hunting seasons on Tuesday, Thursday, and Friday.
 - i. Deer hunting will be closed on Fridays when it coincides with the opening days of a duck season.
- 2) For the lottery hunts in the Lottery Deer Hunt Areas, a limited number of permits (25-30) will be issued through a preseason drawing and hunters may choose their own hunting location anywhere within the hunt area on a first-come, first-served basis. Vacancies will be filled throughout the season. A contractor will administer the issuance of permits and collection of fees for the preseason drawing and vacant hunting opportunities. Firearms hunting will be open for one day during the November shotgun season and for one day during the January shotgun season. For the lottery hunts in the Lottery Non-Ambulatory Deer Hunt Area, hunters must choose from among eleven ground blinds during designated dates in October and November.
 - 3) The refuge will participate in all State hunting seasons and bag limits except the October Antlerless deer season and the late handgun season. The refuge will consider participating in the October Antlerless Season only if an overabundance of deer arises, as determined by the Delaware Division of Fish & Wildlife and concurrence by the refuge, and conflicts with other user groups can be minimized.
 - 4) No check-in or check-out is required except for the Non-Ambulatory Hunt Area.
 - 5) Hunters must be out of the hunting areas one and one-half hours after the evening shooting time.
 - 6) Wheelchair accessible blinds in the Non-Ambulatory Hunt Area are available for non-ambulatory hunters who possess an Interagency Access Passport on Tuesday, Thursday, and Friday on a first-come, first-served basis. Hunters must flip over a tag at the parking area to indicate that a blind is in use. Deer hunting on the entire refuge will be closed on Fridays when it coincides with the opening days of a duck season.
 - 7) Opportunities for scouting will be allowed two weeks before the start of archery season and throughout the deer hunting season.

Regulations for Waterfowl Hunting

- 1) Free-roam hunting is available in the Regular Waterfowl Hunting Area on a first-come, first-served basis everyday during the hunting season until noon. No check-in or check-out is required except for the Non-Ambulatory Area. Zoned areas along the Broadkill River and Petersfield Ditch are also open to hunting.
- 2) For the lottery hunts (except early teal and resident Canada goose season) in the Lottery Waterfowl Hunt Area, a limited number of hunting parties for each day will be selected from a preseason drawing and required to hunt within a defined area around designated blind stakes (24 federal blind sites plus eight state hunting blinds). Hunting is permitted on Monday, Wednesday, and Saturday until noon during the hunting season. Hunting will be open on Fridays when it coincides with the opening days of duck season. Vacancies will be filled throughout the season. A contractor will administer the issuance of permits and collection of fees for both the preseason drawing and vacant hunting opportunities.
- 3) The refuge will participate in all State waterfowl hunting seasons unless otherwise restricted. This includes the duck seasons, early teal season, youth waterfowl hunt, resident Canada goose season, and snow goose season (early and snow goose conservation order).
 - a) Hunting during the early teal, resident Canada goose, and snow goose conservation order will be first-come, first-served in all designated areas, including the Lottery Hunt Area.
- 4) Snow geese may only be taken in the Lottery Hunt Area when the area is open for duck hunting or during the snow goose conservation order.
- 5) A maximum of three people are permitted for each blind stake in the lottery hunt areas.

- 6) Hunters must be out of the hunting areas by 1:00pm.
- 7) Only enrollees who complete the Young Waterfowler Training Program may participate in the mentored hunt in the Lottery Waterfowl Hunt Area. Only young waterfowl hunters may possess or discharge a weapon.
- 8) A wheelchair accessible blind in the Non-Ambulatory Hunt Area is available for disabled hunters who possess an Interagency Access Passport on Monday, Wednesday, and Saturday until noon on a first-come, first-served basis. Hunters must flip over a tag at the parking area to indicate that a blind is in use. Hunting will be open on Fridays when it coincides with the opening days of duck season.
- 9) Hunting dogs are permitted.
- 10) Opportunities for scouting will be allowed on Sundays immediately prior to each of the duck seasons.
- 11) The refuge has designated approximately 3,000 acres as waterfowl sanctuaries that will be closed to hunting and other recreational use on a seasonal or annual basis. These sanctuaries lie in the Unit II (~1,800 acres) and the southern half of the Unit III (~970 acres) managed impoundments. The northern portion of Unit IV (~230 acres), which contains a proposed trail and observation platform, will be closed from the Monday before Thanksgiving to March 15.

Regulations for Upland Game & Webless Migratory Bird Hunting

- 1) The refuge has adopted State hunting regulations and seasons for the Upland Game Hunting Area with the following restrictions:
 - a) The hunting of squirrel is prohibited due to the presence of the endangered Delmarva fox squirrel on the refuge.
 - b) Hunters must be out of the hunting areas one half hour after legal shooting hours.
 - c) Dove hunting is open in the Upland Game Hunting Area except the designated area north of Prime Hook Road.
- 2) No check-in or check-out is required.
- 3) Hunting dogs are permitted.
- 4) Scouting is allowed during designated dates and times.

Regulations for Turkey Hunting

- 1) Hunting of turkey will be permitted in the designated Lottery Turkey Hunt Area in accordance with State hunting regulations and seasons. A limited number of hunters will be selected through a preseason lottery drawing and required to hunt in designated areas.
- 2) The refuge will collaborate with the Delaware Division of Fish & Wildlife to evaluate the status of the wild turkey population on the refuge and determine if it is sufficient to support hunting on the refuge.
- 3) Scouting is allowed during designated dates and times.

(e) Why is this use being proposed?

Hunting is one of the priority public uses defined by Executive Order 12996 (March 25, 1996) and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). This legitimate and appropriate use of a National Wildlife Refuge is generally considered compatible, as long as it does not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the national wildlife refuge.

Sport hunting is a tool managers use to maintain wildlife populations at an acceptable level. In Delaware, the Division of Fish & Wildlife establishes hunting seasons and bag limits to meet population objectives and to offer people the opportunity to experience a traditional outdoor recreational activity. Game species population objectives are determined by a number of factors such as habitat limitations and landowner tolerances, and each year the seasons and bag limits are designed to remove the harvestable surplus without long-term negative impacts to the population. The ability to effectively manage game species populations depends in large part on the availability of land with quality habitat. Providing hunting opportunities on the refuge will aid the State in meeting its management objectives and preserve a wildlife-dependent priority public use long associated with this land.

The Service intends to continue the tradition of wildlife-related recreation on the refuge by allowing hunting in compliance with State regulations. By allowing this use to continue, hunters can experience this traditional recreational activity, aid the refuge and State in maintaining acceptable game species population levels, gain a better appreciation of the refuge’s high quality wildlife habitats, and become better informed about the refuge and the National Wildlife Refuge System.

AVAILABILITY OF RESOURCES:

Administrative changes in the hunting program were implemented to ease the administrative burden on staff resources. Cost savings resulted from the phasing out the use of permanent hunting structures and eliminating the need to have staff conduct daily lottery drawings for permits. These changes reflect a decrease in an estimated 54 days of staff time to conduct the hunt or approximately \$17,890. The benefit of these changes to hunters is a reduction in their cost to hunt. Therefore, the refuge proposes to eliminate permit fees to hunt on the refuge except for lottery hunts for deer, waterfowl, and turkey. For a detailed analysis of the cost of the hunting program, refer to the “Staffing and Funding” section in the refuge’s Hunting Management Plan. Appendix I in the refuge’s CCP, which is a report titled, “Regional Economic Impacts of Current and Proposed Management Alternatives for Prime Hook National Wildlife Refuge,” contains a more robust analysis of the cost comparison of hunting programs between past and current management.

The Refuge Recreation Act requires that funds are available for the development, operation, and maintenance of the permitted forms of recreation. The permit fee (\$10 for deer & turkey; \$15 for waterfowl), preseason application fee (\$5/hunter), and processing fee for permits acquired after the preseason drawing (\$2-3 per hunt) are the minimal amounts needed to offset the cost of facilitating the preseason drawings and manage the lottery hunts. Due to the uncertainty in the level of hunter participation with these new program changes, permit fees may need to be adjusted (increased or decreased) and therefore will be evaluated annually. Preseason lottery drawings are administered by a contracted company that collects information, the required fees, conducts the drawing, and issues the permits. This reduces costs by over \$3,000 and application and processing fees are being paid to the contractors for administering this permitting process. Refuge staff works with the contractor to provide the highest level of customer support. Signs for posting hunting areas, trails, etc. will have an initial, one-time cost. Maintenance of facilities used by hunters (roads, parking lots, trails, and boat launching ramps) will be addressed with the refuge’s deferred maintenance budget. Below is a cost analysis and breakdown of each hunt.

Program	Staff Days	PROPOSED	
		Cost	Recovery
Big Game - Deer	18	\$5,400	\$1,790
Big Game - Turkey	3	\$825	\$300
Upland Game	2.5	\$880	\$0
Waterfowl	14.5	\$5,360	\$5,570
Other Migratory Birds	2.25	\$600	\$0
Total	40.25	\$13,065	\$7,660

Cost Breakdown for All Hunting Programs Combined:

Staff Time (\$9,495) & Actual Expenditures (\$3,570) = \$13,065

Volunteer Contributions for All Hunting Programs Combined (\$20.25 per hour):

48 hrs = \$972

Recovery is the revenue generated by permit and application fees from hunters participating in refuge hunting activities. Regulations for the fee program allow the refuge to retain 80 percent of the total fees collected. Of the total recovery, the contractor administering the preseason lottery drawing will collect \$2,870 in application fees. The refuge will receive 80% of the remaining balance of \$4,790 (\$3,832).

ANTICIPATED IMPACTS OF THE USE:

Hunting can result in positive or negative impacts to the wildlife resource. A positive effect of allowing visitors' access to the refuge will be the provision of additional wildlife-dependent recreational opportunities and a better appreciation and more complete understanding of the wildlife and habitats associated with Delmarva ecosystems. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service. The following is a discussion of refuge-specific impacts, which are supported by a compilation of baseline information relative to the featured topic.

General Impacts of Public Use

Direct impacts are those impacts immediately attributable to an action. Indirect impacts are those impacts that are farther in time and in space. Effects that are minor when considered alone, but collectively may be important are known as cumulative effects. Incremental increases in activities by people engaged in the variety of allowed uses on the refuge could cause cumulative impacts. It will be important for refuge staff to monitor these activities to ensure wildlife resources are not impacted in a detrimental manner.

Impacts on Socioeconomic Environment

The USGS-Fort Collins Science Center estimated the direct and total economic impacts of refuge management activities, including hunting, in Sussex County. Refuge management activities of economic concern included refuge purchases of goods and services within the local community, refuge personnel salary spending, revenues generated by refuge Revenue Sharing, and spending in the local community by refuge visitors, including hunters. The economic impacts were estimated using the "Impacts Analysis for Planning" (IMPLAN) regional input-output modeling system. Refuge management activities directly related to refuge operations generate an estimated \$3.3 million in local output, 30 jobs and \$892.9 thousand in labor income in the local economy. Including direct, indirect, and induced effects, refuge activities would generate total economic impacts of \$4.7 million in local output, 41 jobs and \$1.29 million in labor income.

More specifically, overall hunting activities directly related to refuge operations would generate an estimated \$93.8 thousand in local output, 0.8 jobs, and \$26.9 thousand in labor income in the local economy. Including direct, indirect, and induced effects, overall refuge hunting activities generate an estimated total economic impact of \$132.1 thousand in local output, 1.2 jobs and \$38.5 thousand in labor income. A further breakdown of hunting activities on the refuge, including direct, indirect, and induced effects, reveals that big game hunting on the refuge generates an estimated total economic impact of \$47.8 thousand in local output, 0.4 jobs, and \$13.7 thousand in labor income. Waterfowl hunting on the refuge generates an estimated total economic impact of \$82.3 thousand in local output, 0.8 jobs, and \$24.3 thousand in labor income. Small game hunting on the refuge generates an estimated total economic impact of \$2.0 thousand in local output, 0.02 jobs, and \$500 in labor income.

In 2007, total labor income was estimated at \$2.996 billion and total employment was estimated at 87,113 jobs for Sussex County (IMPLAN 2007 data). The estimated total economic impacts associated with refuge operations represent less than one percent of total income (0.04%) and total employment (0.05%) in the overall Sussex County economy. However, the estimated total economic effects of refuge operations play a larger role in the Prime Hook communities near the refuge such as Milton and Lewes where most of the refuge's public use related economic activity occurs.

Based on these findings, it is expected that hunting will have negligible short-term, long-term or cumulative impacts on the economy of the towns or county in which the refuge lies. This activity is not expected to considerably alter the demographic of economic characteristics of the local community. All refuge actions proposed would neither disproportionately affect any communities nor damage or undermine any businesses or community organizations. No adverse impacts are foreseen to be associated with changes in the community character or demographic composition.

This activity would result in several minor beneficial impacts on the social communities near the refuge and in the state and region as a whole. We expect public use of the refuge to increase, thereby increasing the number of days visitors spend in the area and correspondingly, the level of visitor spending in the local communities.

The “Recreation and Tourism” section in Chapter 3 of the refuge’s CCP provides more information about national and statewide trends in the recreation of hunting.

Impacts on Cultural Resources

With a relatively small number of hunters dispersed across the refuge during the hunting season, impacts would be negligible on the refuge’s cultural resources based on our observations of past hunting impacts. Refuge lands are vulnerable to looting, despite our best efforts at outreach, education, and law enforcement. Upland areas adjacent to wetland areas have been identified for high potential for cultural resources. In addition, refuge visitors may inadvertently or even intentionally damage or disturb known or undiscovered cultural artifacts or historic properties. The refuge will continue to enforce Federal and refuge-specific laws and regulations regarding cultural resources and continue outreach and educational efforts.

For compliance with section 106 of the National Historic Preservation Act, the refuge staff will provide the regional historic preservation officer a description and location of all projects, activities, routine maintenance and operations that affect ground and structures, details on requests for compatible uses, and the range of alternatives considered. That office will analyze those undertakings for their potential to affect historic and prehistoric sites, and consult with the State Historic Preservation Officer and other parties as appropriate. The State and local government officials will be notified to identify concerns about the impacts of those undertakings.

Impacts on Air Quality

Hunting is expected to have negligible adverse short-term, long-term or cumulative impacts on local or regional air quality. Localized increases in emissions from hunter’s vehicles or boat motors would be negligible compared to current off-refuge contributions to pollutant levels and likely increases in air emissions in the Sussex County airshed from land development over the next 15 years. Any adverse air quality effects from refuge activities would be more than offset by the benefits of maintaining the refuge in natural vegetation. The hunting program would not violate EPA standards and would comply with the Clean Air Act.

Impacts on Soils

Hiking or walking can alter habitats by trampling vegetation, compacting soils, and increasing the potential of erosion. Soil compaction makes root penetration more difficult, making it harder for seedlings to become established. In moderate cases of soil compaction, plant cover and biomass is decreased. In highly compacted soils, plant species abundance and diversity is reduced in the long-term as only the most resistant species survive (Liddle 1975).

Using these baseline impacts, the refuge’s hunt program has the potential to cause some soil compaction since off-trail foot travel occurs; however, hunting is expected to have negligible adverse short-term, long-term or cumulative impacts on soils. With a limited number of hunters dispersed across the refuge during the hunting season, impacts would be negligible based on our observations of past hunting impacts. Vehicles would continue to be confined to existing refuge roads and parking lots to minimize impacts outside of that developed footprint. Soil compaction will also occur in the immediate areas surrounding blind site stakes for waterfowl hunting in the Unit III Waterfowl Lottery Area. Impacts to bank erosion will be minimized through the use of no wake zones and a maximum motor restriction of 30 horsepower on Prime Hook Creek and Slaughter Canal.

To facilitate hunting, maintenance or improvement of facilities (parking areas, roads, trails, and boat ramps) will be needed, which are expected to cause negligible to minor short-term impacts to localized soils and waters. Negligible short-term disturbance to soils will occur during the construction of new parking areas on Fowler Beach Road and on Broadkill Beach Road to facilitate hunting.

Several rare peat bog communities have been located near Goose Pond and Flaxhole Pond and these areas are open to deer hunting. Sensitive hydric soils that support these rare plant communities are easily destroyed by trampling. Visitation to these sites will be kept to a minimum in order to protect damage to hydric soils and trampling of sensitive rare plants.

Impacts on Hydrology and Water Quality

Hunting is expected to have negligible adverse short-term, long-term or cumulative impacts on hydrology or water quality based upon staff observations of past hunting impacts. The hunting program would not violate federal or state standards for contributing pollutants to water sources and would comply with the Clean Water Act.

The use of boats by hunters has the potential to affect water quality negatively by increasing erosion, stirring up bottom sediments, or introducing pollutants into waterways. We do not expect emissions from vehicles or boat motors to substantially affect the water quality of the region since the majority of hunters are using air-cooled mud-motors instead of water-cooled two-cycle outboard motors due to the shallow water depth in the hunt areas. Localized increases in emissions from hunter's boat motors would be negligible compared to current off-refuge contributions of boaters to pollutant levels in the nearby Broadkill River and the Delaware Bay. Furthermore, the refuge posts no wake zones and imposes a maximum 30HP restriction on Prime Hook Creek and Slaughter Canal.

Non-toxic shot is required for all hunting except lead slugs for deer/fox hunting. Public outreach and education on littering and proper waste disposal will lessen potential negative water quality impacts.

Impacts on Vegetation

Repeated visitation to any particular locale at the refuge would continue to cause minor site-specific damage to vegetation. Repeated use of an aquatic area by boats equipped with go-devils can damage to emergent and submergent vegetation beds. Portions of or whole plants can be torn, sometimes by roots, and boat wakes contribute to erosion. Accidental introduction of invasive plants, pathogens, or exotic invertebrates attached to boats or trailers, or on shoes or clothing, is another source of direct minor impacts on vegetation. In places where unmarked paths are created by hunters and anglers, little used pathways will retain their dominant vegetation species, but on medium-use pathways some plant species will be replaced and heavily-used paths will often contain invasive species (Liddle and Scorgie 1980).

Using the information previously presented as a baseline and considering staff observations of past impacts, hunting is expected to have negligible adverse short-term, long-term, or cumulative impacts on vegetation. Disturbance to vegetation will increase due to an expected increase in deer and waterfowl hunters in new free roam hunting areas in upland and wetland habitats during all hunting seasons, particularly around blinds sites in the Unit III impoundments. The possibility for new trails to be developed from repeated hunter entry may occur. However, given the large expanse of both upland and wetland acreage, anticipated dispersal of hunters across hunting areas, the inherent nature of hunters to only travel as far as needed to find a hunting location, and knowing that most vegetative species will have already undergone senescence or become dormant, negligible impacts to vegetation from hunting is expected.

Furthermore, the phasing out and removal of all of the refuge's 130+ deer hunting stands and waterfowl hunting blinds will remove disturbance to impacted vegetation and soils and create a more aesthetically pleasing landscape for refuge visitors. Impacts to vegetation are also minimized by not permitting hunters to cut vegetation for shooting lanes or for use as camouflage. No natural vegetation is permitted for use as camouflage on the refuge. Impacts to vegetation are further minimized because permanent stand hunting, which often utilizes nails, wire, screws, or other methods for tree attachment is prohibited.

Hunting plays a role in how white-tailed deer, snow geese, resident non-migratory Canada geese, and mute swans impact vegetation. Canada goose herbivory during the growing season is a relatively new impact upon wetlands. In 2002, a research study conducted at neighboring refuges, Bombay Hook and Chincoteague NWRs, suggested that higher levels of use by geese may cause a long-term change in wetland community structure (Laskowski et al. 2002). Biomass of several species of vegetation was significantly adversely impacted by feeding resident Canada geese at both refuges. Resident geese directly damage agricultural resources by eating grain crops and trampling spring seedlings. Heavy grazing by geese can result in reduced yields and in some instances a total loss of the grain crop (Allen et al. 1985, Flegler et al. 1987). Lethal and nonlethal Canada goose control activities outlined under all strategies common to all alternatives would be expected to significantly decrease the number of injurious resident Canada geese in specific areas, thus reducing local impacts on vegetation. The long-term viability of migrant Canada goose populations would not be affected, however. Similarly, because mute swans are highly invasive of wetland habitats, and can consume large quantities of submerged aquatic vegetation, control of mute swans on the refuge will have a local beneficial impact on wetland vegetation communities.

Various light goose (snow goose) populations in North America have reached such high levels that they are damaging habitats on their Arctic and sub-Arctic breeding areas (Abraham and Jefferies 1997, Alisauskas 1998, Jano et al. 1998, Didiuk et al. 2001) as well as in some migration and wintering areas (Giroux and Bedard 1987, Giroux et al. 1998, Widjeskog 1977, Smith and Odum 1981, Young 1985). The increasing numbers of light-geese are viewed as a continental problem, but with real local adverse impacts on vegetation. Grubbing for rhizomes, especially in salt marshes, results in areas denuded of vegetation, typically referred to as eat-outs. Vegetation density at these eat-outs may return to previous normal levels after several years, if left alone. However, where eat-outs occur within salt marsh habitats, snow geese often return each winter to the same areas to feed. Such impacts have been observed at the refuge. It is also speculated that during the time snow geese are feeding in a salt marsh, much of the soil and sediment may be loosened and placed into suspension. In fact, recently analyzed water quality samples from refuge impoundments have found extremely high sediment concentration in the water during times of extensive snow goose browsing on the refuge. This material may then be washed away during high or flood tide periods. After several years of successive erosive eat-outs at the same location, the lower ground elevation may further prevent the return of vegetation, causing a more long-term impact to vegetation community on the site. Reducing snow goose numbers on the refuge will reduce adverse minor-to-moderate impacts of snow goose herbivory on salt marsh habitats.

Deer overabundance can affect native vegetation and natural ecosystems and has been well-studied (Tilghman 1989, Nudds 1980, Hunter 1990, Behrend et al. 1970). White-tailed deer selectively forage on vegetation (Strole and Anderson 1992), and thus can have substantial impacts on certain herbaceous and woody species and on overall plant community structure (Waller and Alverson 1997). Over-browsing by deer can decrease tree reproduction, understory vegetation cover, plant density, and plant diversity (Warren 1991). High densities of deer have also been recognized as vectors for spreading invasive species like Japanese stiltgrass. Thus, control of the white-tailed deer population on the refuge will have a moderate beneficial impact on the vegetation communities.

Impacts on Federal and State Endangered Species

Disturbance factors resulting from public use are always considered for all listed species. The Delmarva fox squirrel and piping plover are listed as endangered and threatened by the U.S. Fish and Wildlife Service and the red knot was designated as a candidate species in 2006 for possible listing. Several other species listed as endangered by the Delaware Division of Fish & Wildlife include American oystercatcher (, common tern, Forster's tern, least tern, and bald eagle (. Of these, the piping plover, red knot, American oystercatcher, common tern, Forster's tern, and least tern will not be impacted by hunting because they would be unlikely to use the refuge's forested habitats and/or their occurrence on the refuge is outside of the hunting season for deer, upland game, and waterfowl. A Section 7 Evaluation has been conducted as part of this review and it was determined that proposed activities would not likely affect the Delmarva fox squirrel or piping plover. Furthermore, the hunting of any squirrel species is prohibited on the refuge to further minimize impacts to this endangered species.

While the bald eagle is no longer a federally listed species, the refuge uses the National Bald Eagle Management Guidelines for bald eagle management to implement time-of-year restrictions for nesting eagles. The guidelines do not permit any activity within 330 feet of an active nest during the breeding season, particularly where eagles are unaccustomed to such activity (U.S. Fish and Wildlife Service 2007).

Hunting on or near Turkle Pond was an existing activity prior to nesting by bald eagles on the adjacent Horse Island. When bald eagles were listed as endangered, the Section 7 Evaluation conducted on the refuge concluded that this activity in Turkle Pond would not likely affect this species and the use was permitted. We will monitor use in Turkle Pond to determine if there is an impact on the eagle nest on Horse Island.

Impacts on Waterfowl

Below is a discussion of the generalized impacts of hunting on critical life history requirements of waterfowl, the use of sanctuaries to mitigate adverse impacts to waterfowl, and impacts of hunting through the harvest of waterfowl. Refuge-specific impacts of hunting on waterfowl are discussed in each of these sections.

Wintering Waterfowl – Waterfowl Habitats

Since the refuge consists of 80 percent wetlands, all recreational activity has the potential of impacting waterfowl, shorebirds, marsh birds, and other migratory bird populations feeding and/or resting near hunting area(s). Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes departure from the area (Owen 1973, Burger 1981, Korschgen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and

Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day.

During the period of September 1 – March 15, which is when most wintering and migrating waterfowl are on the refuge, adverse impacts to these birds could result from unregulated human disturbance in optimum waterfowl habitats at the refuge. This conclusion is based on the role of disturbance as it relates to waterfowl life history requirements and behaviors such as feeding, flight, metabolic processes, molting, preening, and resting. These daily waterfowl maintenance activities are costly from an energetic standpoint and require that waterfowl have undisturbed access to quality habitats with diverse food resources to meet their daily and seasonal energy requirements. Since these activities are critical to the survival of waterfowl, a discussion of their behaviors and metabolic processes is appropriate.

Feeding: Waterfowl have complex feeding strategies, which are conducted at optimum levels only in an environment void of disturbance. Feeding is the only activity that provides energy to birds, and the amount of time allocated to feeding is dependent upon relationships between energy-nutrient requirements and foraging strategies used in meeting these needs (King 1974). Feeding on readily available and easily consumed foods requires less time than feeding on dispersed food resources, foods which require searching (e.g. mobile invertebrates). or food that require complex foraging behavior (e.g., underground tubers) (Rapport 1980).

Generally, feeding periods for wintering waterfowl are early morning and late evening. Morton, et al., (1989) found that American black ducks spent an average of 4.49 hours per day feeding, with the majority of feeding activity occurring either during the first three hours after daylight, or the last three hours of the day, and then spent the remainder of the day engaging in resting, (4.54 hours) swimming, (1.83 hours), and engaging in other maintenance activities (balance of the day). This suggests that waterfowl, when undisturbed, prefer to feed early and late, and spend the remainder of the day in maintenance activities such as resting, preening, or courtship.

Mallards generally do not feed in water deeper than 40 cm (Thomas 1976), but prefer to feed in water depths of 10 cm or less (Fredrickson and Taylor 1982). This habitat type can be readily found within the refuge's impoundment complex. Accordingly, unregulated access to these habitats could adversely impact the feeding strategies of waterfowl using the refuge.

Flight: Many research projects have been conducted on the basic energy requirements of waterfowl, and these projects emphasize the importance of readily available food resources. As birds arrive in Delaware during fall migration, they need areas to rest and feed to replenish energy reserves. Migratory flight is often associated only with migration; however, it is important to recognize that approximately 90 percent of the migration period is spent in a stationary mode at successive stopover sites (Hedenstrom and Alerstam 1998). Birds at stopover sites spend their time resting and foraging as they rebuild protein and energy stores in preparation for their next migratory flight (McWilliams, et al 2004). It is also important to recognize that the cost associated with flight is a very expensive activity from a metabolic perspective and forcing birds into flight creates the need to replace lost energy reserves that could have been used for other maintenance activities. Protection is needed to allow waterfowl the opportunity to forage and replenish energy reserves depleted during migration to prevent the energetic expenditure associated with unnecessary flight.

Metabolic Processes: In addition to flight and along with rebuilding protein and energy stores, birds have basic energy maintenance requirements. These daily requirements, which include the energy costs of thermoregulation, maintenance of basal metabolic rate (BMR), and other activities, combine to account for 40-60 percent of the annual energy budget (Walsberg 1983). Thus, without reliable access to high quality food resources, waterfowl must either migrate to better habitats or suffer reduced fat reserves, which can result in below optimum body condition. As an illustration of the food resources required to maintain body condition, Magee (1996) found that, in waterfowl, the energetic cost of flight for one hour would require the equivalent energy reserves of enough foraging effort to consume 19.6 grams of corn (75 kernels) or 117.8 grams of amphipods (6,250 individuals) to replace lost energy reserves. And, from the standpoint of how fat deposition relates to reproductive potential, Heitmeyer (1985) discovered that hen mallards in the Mingo Basin of Missouri needed to reach a minimum weight threshold of 1,360 grams (>3 pounds) before leaving the wintering grounds to ensure there would be adequate fat reserves to initiate nesting activities upon arrival at the breeding grounds. At Chincoteague NWR, Morton et al (1989) found that wintering black ducks experienced reduced energy intake while doubling energy expenditure by increasing the time spent in locomotion in response to disturbance. Black

ducks used 10.4 times more energy in flight than at rest and used 1.8 times more energy in alert behavior or swimming than at rest, suggesting that human disturbance of wintering black ducks impaired their physiological condition, thereby reducing winter survival and/or nutrient reserves carried to the breeding grounds. Therefore, during migration stopovers, waterfowl must be afforded the time and opportunity to forage in high quality habitat to attain the desired body mass and fat depots, and replace lost energy reserves. To meet the metabolic demands of migration, waterfowl rely on many Federal, State, and private wetlands, including Prime Hook NWR, to rest, feed, and reacquire lost fatty deposits.

Molting: Feather molts are very costly from a metabolic standpoint, as waterfowl are converting from the alternate (summer) plumage to their basic (breeding) plumage. Most feathers are replaced during this period, as these birds are preparing for courtship rituals and pair bonding. Heitmeyer (1985) describes the prebasic molt of female mallards as extensive and intense, as these birds replace approximately 50 grams of feathers in a 6-7 week period, which requires a substantial amount of energy reserves. This increase in nutrient demand translates to the need for individual mallards to be afforded the opportunity for undisturbed foraging. Excess disturbance may negatively impact the ability of waterfowl to secure nutrients, thus disrupting molting processes and associated reproductive strategies.

Preening: Maintenance of feathers by preening has been previously correlated to molt activity and is undoubtedly influenced by molt chronology. Male mallards preen most often during autumn; but preening declines throughout early winter, which corresponds with declining molt activity (Combs 1987). Adverse impacts affecting preening activities would be similar to those associated with the molting process.

Resting: Resting appears to be a complementary activity to feeding, molting, and preening. As feeding declines from morning to afternoon, resting increases, which is necessary to allow birds to digest food consumed during previous periods of feeding (Paulus 1984b, Clark et al. 1986), and to rejuvenate muscle fibers that may have been damaged during periods of flight (McWilliams et al. 2004). The inability of waterfowl to rest may have a direct negative impact on the ability of waterfowl to digest foods and repair muscle fibers, thus impacting other necessary life history behaviors.

Waterfowl Sanctuaries

As discussed in the previous section, wintering waterfowl need access to areas that are free from human disturbance to complete seasonal and annual life cycle events. A disturbance can be characterized as an activity that causes an animal to deviate from behavior patterns that normally transpire without human influence. To explain further, a disturbance stimulus is produced when a human-related presence or object (e.g. birdwatcher; motorized vehicle) or sound (e.g. seismic blast or gunshot) occurs that causes changes to the natural behavioral patterns of animals (Frid and Dill 2002). Activities such as hiking, photography, jogging, hunting, fishing, boating, research and management activities, bicycling, and driving are among many types of disturbance that can and do occur on any National Wildlife Refuge. Because a disturbance free sanctuary is critical to waterfowl during the period of September 1 – March 15, it is important to understand that if unrestricted access is allowed to the entire refuge, the ability of the Prime Hook NWR sanctuary to meet the needs of waterfowl is reduced. The following sections discuss the values and functions of waterfowl sanctuaries and illustrate the impacts of disturbance on the ability of waterfowl to utilize habitats.

Disturbance is a primary factor influencing avoidance behaviors in waterfowl (Paulus 1984b, Heitmeyer 1985, Austin 1987) as ducks and geese are highly sensitive to motor traffic and human disturbance (walking, bird viewing, vehicular traffic) along roads during fall and winter (e.g., Bartelt 1987, Belanger and Bedard 1989, 1990, Bowles 1995, Dalhgren and Korschgen 1992, Gabrielson and Smith 1995, Heitmeyer 1985, Klein 1989, Knight and Cole 1991, 1995; Madsen 1985, Van Der Zande et al. 1980, Raasch 1996). Thus, when waterfowl are in areas adjacent to roads, they reduce time spent foraging and spend more time alert and vigilant to disturbance. For instance, a research study examining disturbance effects conducted on Mingo NWR in southeastern Missouri showed that mallards became alert at a mean distance of 213 meters (m), which is equivalent to 698 feet (ft), and flew from the site at a mean distance of 173 m (568 ft) in response to vehicle disturbance (Raasch 1996). In another study in Virginia, Pease, et al. (2005) described the responses of seven species of dabbling ducks to six different forms of disturbance and recorded whether the birds had: 1) no response; 2) alert response; 3) swam; and 4) flew. Analysis of the data from Virginia showed that 74.2 percent of birds responded (alert, swam, or flew) when birds were within 200 m (656 ft) of a human caused disturbance. As a result, when birds exhibit avoidance behaviors, swimming and flying activities increase while resting and feeding activities decrease (Combs 1987). This activity creates the need for additional foraging effort, which in turn influences seasonal movements and habitat selection. Areas that do not have regulations can cause increased human-wildlife interactions that can negatively affect the life history behaviors and metabolic processes of migratory waterfowl.

Laskowski et al. (1993) studied behavior of snowy egrets, female mallards, and greater yellowlegs on Back Bay NWR in Virginia within 91.4 meters of impoundment dikes used by the general public. The behavior of snowy egrets was recorded during August and September; mallards were monitored during migration in November and January; and greater yellowlegs behavior were observed during the northward shorebird migration. Researchers observed the behavior of birds during the typical public activities of walking, bicycling, and driving vehicles past the sample sites.

The study found that snowy egret resting behavior decreased and alert behavior increased in the presence of humans. Preening decreased when humans were present, but this change was not significant. Feeding, walk/swim, and flight behaviors were not related to human presence. Female mallards in November increased feeding, preening and alert behaviors in the presence of humans. Resting, walk/swim, and flight behavior were not influenced by human presence. In January, female mallard resting and preening behavior were not influenced by the presence of humans. However, feeding, alert, walk/swim, and flight behaviors were related to human presence. Greater yellowlegs increased alert behavior in the presence of humans. No other behaviors were affected. Maintenance behavior (combined feeding, resting, and preening) decreased when humans were present for all study species. In addition, this decrease was accompanied by an increase in escape behavior by each species. Maintenance behavior of mallards in January decreased in the presence of vehicles and combined disturbance. Escape behavior increased when vehicles or bicycles were present. Maintenance behavior of greater yellowlegs declined when bicycles and vehicles were present but was not influenced by pedestrian presence. Snowy egrets and female mallards increased movement between subplots and to areas within the study area but further from the disturbance.

The speed of vehicles has been identified as a factor that affects waterfowl response behavior. Objects that approach waterfowl quickly tend to frighten birds more often than objects that approach at lower speeds (Frid and Dill, 2002). Pease (2005), found that vehicles traveling more than 13 miles per hour but less than 30 miles per hour created the least amount of disturbance. As a contrast to speed, Pease noted that humans approaching waterfowl on foot had a greater disturbance impact than passing vehicles. Thus, research suggests that waterfowl are disturbed less by vehicles that pass at a moderate rate of speed, and more distressed by vehicles going very fast, very slow, or by humans on foot.

Non-motorized boating can affect refuge resources in a number of ways. Studies show that canoes and kayaks disturb wildlife (Bouffard 1982, Kaiser and Fritzell 1984 Knight 1984; Kahl 1991). The use of non-motorized boats can affect waterfowl broods, wintering waterfowl, shorebirds, raptors, and wading-birds. The low speeds associated with these boat types and their use primarily during the warmer months would mitigate those impacts, especially on wintering waterfowl and raptors. Canoeing/kayaking occur in areas frequented by shorebirds less often. Air thrust boats and jet skis are not permitted.

When birds leave the refuge because of human disturbance, high quality habitat is left unutilized for the duration of time that the birds are displaced. The length of time that a bird is displaced from a feeding site determines how much additional foraging effort will be required to replace lost food resources, which in turn impacts other maintenance activities such as molting, resting and preening. There are a number of research studies that examined how long it took waterfowl to return to habitats after being disturbed. For example, the return rate of mallards and Canada geese at Mingo NWR following vehicular disturbance indicated that two thirds of the birds were displaced after 25 minutes. At the Russell Lakes State Wildlife Area in Colorado, mallards flew from a pond during disturbances and did not return within 1 hour (George et al. 1991). In Wisconsin, only 15-56 percent of canvasbacks returned to foraging sites following disturbances (Kahl 1991), and staging snow geese populations in Quebec were found to be lower the day after they have been disturbed at a rate of less than two disturbances per hour, and that vehicular disturbance and unobstructed visual sight planes of approximately 400-500 m (1312 -1640 ft) are detrimental to waterfowl use and subsequent rates of return (Belanger and Bedard 1989). Thus, repeated disturbances (> 2 per hour), which could occur if unregulated access is permitted, can have serious detrimental impacts on the utilization of seasonal wetlands, which may ultimately cause birds to completely abandon a site, disperse to poorer quality habitat, and/or change feeding strategies.

Public use and access is important, but uses must be managed so that disturbance to wildlife is minimized and habitat utilization is not compromised. With these objectives in mind, it becomes necessary to recognize that disturbance to waterfowl early and late in the day can negatively impact biological processes such as feeding, flight, metabolic processes, molting, preening, and resting. For example, birds are feeding early in the morning

to obtain food resources, but are beginning to come to roost at sunset to begin a period of rest after returning from evening feeding. This period of rest is just as important as feeding because it permits the digestion of food prior to roosting and allows the repair of muscle fibers damaged during flight. Therefore, if measures to minimize or eliminate the cause of disturbance are not considered, the impacts from these activities can negatively affect the potential for wildlife to acquire the necessary resources needed to meet nutritional life history requirements throughout their annual life cycle (Raasch 1996, Fredrickson and Reid, 1988).

Providing waterfowl sanctuaries will minimize some of these impacts. Sanctuaries afford undisturbed access to waterfowl during biologically critical periods of the day. Havera et al. (1992) and Dahlgren (1988), in comprehensive literature reviews of human disturbances to migrating and wintering waterfowl, note that the use of sanctuaries (non-hunted areas) is the most common and effective solution to mitigating adverse disturbance impacts.

The use of sanctuaries as a management tool is an old concept. Bellrose (1954) wrote of the early 1900's when owners of duck lands found that providing non-hunted areas on their properties was of value in building and holding concentrations of waterfowl. A distinctive degree of sense of security constituted the principal factor governing duck use of areas that were all hunted, half hunted/half unhunted, or no hunting. Waterfowl numbers averaged 16 times more abundant per acre on half hunted/half unhunted areas than on areas that were completely hunted.

Other hunting measures that serve to mitigate adverse impacts to waterfowl:

- 1) provide adequate buffer areas and large enough sanctuaries to ensure full use by waterfowl;
- 2) provide “temporal respite” for ducks by limiting hunts to half days and/or use an intermittent hunt program (3-4 hunts/week); and
- 3) regulate hunter access limiting boat access and traffic to specific areas.

To minimize waterfowl disturbance, the refuge has designated approximately 3,000 acres as waterfowl sanctuaries. These areas will be closed to hunting and other recreational uses on a seasonal or annual basis. Given the dominant role of the refuge in the Atlantic Flyway migration corridor, this closed area system was established to provide waterfowl with a network of resting and feeding areas and to disperse waterfowl hunting opportunities on the refuge. These sanctuaries support policy 7 RM 3.6D. These sanctuaries lie in the Unit II (~1,800 acres) and the southern half of the Unit III (~970 acres) managed impoundments. The northern portion of Unit IV (~230 acres), which contains a proposed trail and observation platform, will be closed from the Monday before Thanksgiving to March 15 to also minimize disturbance to wildlife in this area. Waterfowl hunting will be terminated at noon in all hunting areas on limited hunting days to reduce disturbance to waterfowl feeding patterns, which in turn will result in high quality hunting experiences. Literature reviews of visitor use and its relationship to disturbance to waterbirds support the time restriction and are reflected in the hunting regulations of other refuges, particularly in the Southeast Region of the FWS (DeLong 2002).

Hunting is a priority, wildlife-dependent, consumptive activity with additional direct effects on waterfowl. General adverse impacts of waterfowl hunting are mortality, crippling and disturbance. Belanger and Bedard (1995) concluded that disturbance caused by waterfowl hunting to waterfowl resources can:

- 1) modify the distribution and use of habitats by waterfowl;
- 2) affect their activity budget and decrease their foraging time; and
- 3) disrupt pair and family bonds and contribute to increased hunting mortality.

The U.S. Fish and Wildlife Service annually prescribe frameworks, or outer limits, for dates and times when hunting may occur and the number of birds that may be taken and possessed. These frameworks are necessary to allow State selections of season and limits for recreation and sustenance; aid Federal, State, and tribal governments in the management of migratory game birds; and permit harvests at levels compatible with

population status and habitat conditions. Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds are closed unless specifically opened by the Secretary of the Interior, the Service annually promulgates regulations (50 CFR Part 20) establishing the frameworks from which States may select season dates, bag limits, shooting hours, and other options for each migratory bird hunting season. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them. Federal annual regulations both allow and limit the hunting of migratory birds.

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when “hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any bird, or any part, nest, or egg” of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to “the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the U.S. Fish and Wildlife Service as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the Service has administratively divided the nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. Prime Hook NWR is in the Atlantic Flyway.

The process for adopting migratory game bird hunting regulations, located in 50 CFR part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rule making process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation. The process of adopting migratory game bird hunting regulations includes two separate regulations-development schedules, based on “early” and “late” hunting season regulations. Early hunting seasons pertain to all migratory game bird species in Alaska, Hawaii, Puerto Rico, and the Virgin Islands; migratory game birds other than waterfowl (e.g. dove, woodcock, etc.); and special early waterfowl seasons, such as teal or resident Canada geese. Early hunting seasons generally begin prior to October 1. Late hunting seasons generally start on or after October 1 and include most waterfowl season not already established. There are basically no differences in the processes for establishing either early or late hunting seasons. For each cycle, Service biologists and others gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties. Though not as detailed as that for waterfowl, relevant data are collected and summarized for migratory bird species such as dove, woodcock, etc. Bird monitoring data are available through the Service’s Division of Migratory Bird Management Website (<http://www.fws.gov/migratorybirds/>; accessed February 2012).

Because the Service is required to take abundance of migratory birds and other factors into consideration, the Service undertakes a number of surveys throughout the year in conjunction with the Canadian Wildlife Service, State and Provincial wildlife-management agencies, and others. To determine the appropriate frameworks for each species, several factors are considered such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the number of hunters, and the anticipated harvest. After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, migratory game bird management becomes a cooperative effort of State and Federal Governments. After Service establishment of final frameworks for hunting seasons, the States may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the Federal frameworks but never more liberal. 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 National Wildlife Refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the State allows.

National Environmental Policy Act (NEPA) considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, “Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FSES 88-14),” filed with the Environmental Protection Agency on June 9, 1988. A Notice of Availability is published in the Federal Register on June 16, 1988 (53 FR 22582), and our Record of Decision on August 18, 1988 (53 FR 31341). Annual NEPA

considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment in which the FONSI is published generally in August of that hunt year. Further, in a notice published in the September 8, 2005, Federal Register (70 FR 53376); the Service announced its intent to develop a new Supplemental Environmental Impact Statement for the migratory bird hunting program. Public scoping meetings were held in the spring of 2006, as announced in a March 9, 2006, Federal Register notice (71 FR 12216). More information may be obtained from Chief, Division of Migratory Bird Management., US Fish and Wildlife Service, Department of the Interior, MS MBSP-4107-ARLSQ, 1849 C Street, NWR, Washington, DC 20240.

At Prime Hook NWR, the impacts of hunting of waterfowl are negligible when compared to the State’s total waterfowl harvest. For example, from 1987 to 2009, the average annual waterfowl harvest at the refuge is 2.6 percent of Delaware’s total waterfowl harvest (Table 1.1). Furthermore, in 2009, the refuge’s harvest of ducks was only 3.4 percent of Delaware’s total duck harvest, 0.96 percent of the Atlantic Flyway’s duck harvest, and 0.01 percent of the entire United States’ duck harvest (Table 1.2; Raftovich et al. 2011). Also in 2009, the refuge’s harvest of geese (Canada and snow geese combined) was only 0.82 percent of Delaware’s total goose harvest, 0.04 percent of the Atlantic Flyway’s goose harvest, and 0.01 percent of the entire United States’ goose harvest. (Table 1.2; Raftovich et al. 2011).

The impacts of waterfowl hunting at the refuge are also negligible when compared to long-term trends in duck and goose populations at the refuge and across the state. Through monthly aerial surveys from October through November, the Delaware Division of Fish and Wildlife is able to evaluate long-term trends in duck and goose populations. The surveys give fairly accurate information about geese, but duck populations such as wood ducks and sea ducks are almost impossible to count. Furthermore, these surveys do not cover the entire state, but only the primary waterfowl habitat in Delaware, which is approximately the eastern half of the state. These figures represent the numbers of ducks and geese at the time of the survey, but do not reflect an actual annual estimate for the waterfowl population in Delaware due to the transitory nature of birds migrating through the State during the fall and winter months.

Based on the findings of these monthly surveys from 1987 to 2009, the average annual waterfowl harvest at the refuge is only 1.8 percent of the estimated peak waterfowl survey findings on the refuge (Table 1.1). During an individual season, the percent of the refuge’s harvest on statewide and refuge populations may range greatly depending on the timing of refuge hunting activity and peak waterfowl migration. For example, during the 2009-2010 hunting season, the refuge harvested between 0.19 percent and 1.5 percent of the State’s estimated monthly duck population and between 0.02 percent and 0.11 percent of the State’s estimated monthly goose population (Table 1.3). Refuge hunters harvested between 0.31 percent and 6.15 percent of the refuge’s estimated monthly duck population and between 0.09 percent and 1.48 percent of the refuge’s estimated monthly goose population (Table 1.3).

Table 1.1. Waterfowl harvest and aerial survey estimates on Prime Hook NWR compared to statewide harvest. Waterfowl includes geese and ducks.

Year	Statewide Waterfowl Harvest*	Refuge Waterfowl Harvest	Refuge Waterfowl Survey**	Refuge Hunter Visits
1987	63,360	1,202	21,243	1,206
1988	62,160	771	21,814	826
1989	61,480	578	64,822	333
1990	59,510	1,241	49,611	1,065
1991	63,410	1,625	55,792	1,178
1992	46,600	1,155	55,238	1,291
1993	46,850	1,421	86,087	962
1994	53,290	2,053	155,096	1,604
1995	45,540	1,572	71,131	1,024
1996	44,170	1,980	104,447	1,630
1997	71,070	3,116	191,446	1,904

Year	Statewide Waterfowl Harvest*	Refuge Waterfowl Harvest	Refuge Waterfowl Survey**	Refuge Hunter Visits
1998	118,560	2,964	193,617	1,530
1999	96,410	1,987	224,693	1,403
2000	94,610	2,047	134,156	1,250
2001	76,210	2,679	107,919	1,683
2002	95,170	1,936	102,690	1,330
2003	88,800	2,546	203,615	1,486
2004	73,190	1,573	69,737	1,422
2005	71,740	1,624	111,544	1,301
2006	64,630	2,389	132,088	1,750
2007	81,620	2,989	44,086	1,850
2008	107,120	1,634	90,875	1,253
2009	86,600	1,934	79,263	1,453

*Statewide waterfowl harvest data from: <http://www.flyways.us/regulations-and-harvest/harvest-trends>

** Waterfowl estimates were derived from peak numbers found during aerial surveys. Zone 7 was used to estimate waterfowl numbers for the refuge, which covers the area from Big Stone Beach to the Broadkill River and east of Route 1. Only one survey was conducted in 2007 (October 2007) which may not have reflected the peak. (<http://www.fw.delaware.gov/Hunting/Pages/Waterfowl%20Surveys.aspx>)

Table 1.2. Comparison of waterfowl harvest at Prime Hook NWR to State, Flyway, and United States harvest in the 2009 hunting season.

Waterfowl Harvest Area	Ducks	Geese
Prime Hook NWR	1,609	325
Delaware*	46,800	39,800
Atlantic Flyway*	1,680,100	922,200
United States*	13,139,800	3,327,000

*Harvest estimates from (Raftovich et al. 2011)

Table 1.3. Comparison of duck and goose (Canada & snow geese) harvest at Prime Hook NWR to State waterfowl surveys during the 2009-2010 hunting season.

Month	Refuge Duck Harvest	Refuge Duck Population Estimates*	Statewide Duck Survey Results*	Refuge Goose Harvest	Refuge Goose Population Estimates*	Statewide Goose Survey Results*
Oct 2009	67	21,457	36,042	9	10,512	44,372
Nov 2009	406	30,548	63,516	104	18,734	92,604
Dec 2009	697	46,675	76,100	115	32,588	247,922
Jan 2010	439	7,141	28,688	97	6,565	102,229

* Waterfowl estimates were derived from peak numbers found during aerial surveys. Zone 7 was used to estimate waterfowl numbers for the refuge, which covers the area from Big Stone Beach to the Broadkill River and east of Route 1. (<http://www.fw.delaware.gov/Hunting/Pages/Waterfowl%20Surveys.aspx>)

Impacts of refuge hunting on snow geese and resident Canada geese are negligible. For resident Canada geese, hunters averaged 8.8 birds per year from 2001 to 2006 (Table 1.4). For snow geese in the late season (late January into March), hunters averaged 16.0 birds per year from 2001 to 2006 (Table 1.5). From 2000 to 2009,

refuge hunters harvested between 0.04 percent and 0.43 percent of the refuge’s estimated monthly snow goose population (Table 1.5).

Table 1.4. Resident Canada Goose Harvest in Prime Hook National Wildlife Refuge.

Year	Resident Canada Goose Harvest	Refuge Hunter Visits
2001	14	33
2002	6	15
2003	10	13
2004	14	10
2005	0	0
2006	9	2

Table 1.5. Snow Goose Harvest and Aerial Survey Estimates at Prime Hook National Wildlife Refuge.

Year	Total Snow Goose Harvest*	Hunted in Late Season**	Snow Goose Harvested in Late Season**	Refuge Hunter Visits in Late Season**	Refuge Snow Goose Survey***
2000	174	No	n/a	n/a	96,112
2001	242	Yes	37	42	67,840
2002	48	Yes	7	9	72,200
2003	118	Yes	33	24	124,500
2004	121	Yes	3	5	55,330
2005	36	Yes	4	8	86,627
2006	73	Yes	12	12	132,088
2007	130	No	n/a	n/a	30,500
2008	56	No	n/a	n/a	84,520
2009	43	No	n/a	n/a	27,000

* Includes snow geese harvested in February / March when applicable

** Late season includes late January to mid-March

*** Snow goose estimates were derived from peak numbers found during aerial. Zone 7 was used to estimate snow goose numbers for the refuge, which covers the area from Big Stone Beach to the Broadkill River and east of Route 1. Only one survey was conducted in 2007 (October 2007) which may not have reflected the peak. (<http://www.fw.delaware.gov/Hunting/Pages/Waterfowl%20Surveys.aspx>)

Migratory bird hunters may also disturb migratory birds and other wildlife as they travel to and from their hunting sites or when retrieving downed birds. Depending on the location and the number/species of migratory birds in the area, a disturbance can be temporary with displaced birds moving to nearby backwaters, or major in the case of motoring through a large flock of snow geese. For some species like bald eagles and other predators, migratory bird hunting creates a readily available food source due to birds lost or wounded.

Direct disturbance to waterfowl occurs during white-tailed deer hunting seasons, as hunters flush deer through wetlands, creeks, and open water habitats. Dogs running at large during upland game hunting seasons will also flush wintering waterfowl resting and feeding in both wetland and upland areas. The ingestion of lead sinkers or lead shot is another concern; however, the impacts are lessened on refuge lands due to regulations requiring the use of non-toxic shot for upland hunting, except for slugs for deer hunting.

Expanded hunting opportunities for deer and waterfowl will cause disturbance to waterfowl in refuge impoundments, Prime Hook Creek, and refuge salt marshes. On Prime Hook Creek, deer hunting will occur on Tuesday, Thursday, and Friday during the hunting seasons. On refuge impoundments in Unit III and Prime Hook Creek, waterfowl hunting will occur on Monday, Wednesday, and Saturday during the hunting season. If the opening day of any duck season is Friday, waterfowl hunting will be open and deer hunting will not occur. Impacts to waterfowl will be decreased from current management by changing the end of shooting time from 3:00pm

to noon. Participating in the early teal, resident Canada goose, and snow goose conservation order will cause direct impacts to increase but will be negligible based on current refuge harvest contributions to statewide and national harvests. Free roam areas for deer and waterfowl hunting (jump shooting) will provide hunters greater access and also increase the potential for waterfowl disturbance. These disturbances are mitigated by creating sanctuary areas where no waterfowl hunting occurs.

Proposed waterfowl hunting in Units I and IV salt marshes have the potential to increase adverse impacts and disturbance on refuge wintering American black ducks. Zoned hunting areas have been established in Unit IV to limit hunter numbers, thereby minimizing wildlife disturbance. Since black ducks are a focal species of conservation concern, monitoring and the evaluation of impacts of increased recreational use of salt marsh habitats will be required to identify and respond to unacceptable impacts.

Impacts to Shorebirds

Disturbance to shorebirds has been well documented. Pfister et al. (1992) investigated human disturbance as a factor that might limit the capacity of appropriate staging areas to support migrating shorebirds. Results indicate that adverse impacts from human disturbance will be greater on shorebird species using the front side of beach habitats and that the local abundance of impacted species may be reduced by 50 percent. Such disturbance is implicated as a potential factor in long-term declines in shorebird abundance during migration periods at disturbed sites.

Disturbance to shorebirds becomes very crucial during incubation or nesting periods. Direct adverse impacts of displacement caused by human disturbance during nesting periods include egg exposure to temperature extremes, predation of eggs when the nest is vacated by the adult, and predation at a later time due to predators following human trail or scent (Korschgen and Dahlgren 1992). Protection of nesting colonial shorebirds is easier than protection of solitary nesters, like the American oystercatcher and piping plover, because much larger beach areas must be protected, managed, and patrolled. Public education, active protection methods (small fences around nests, signs, wardens), legal measures (beach use regulations, active enforcement patrols), and well-advertised closures of portions of the beach are management actions that often successfully reduce the adverse impacts of human disturbance when shorebirds are most vulnerable. Protection of nesting colonies using fences and wardens has markedly decreased reproductive losses of least tern colonies in New Jersey (Burger 1995).

Based on these findings and past observations of impacts on shorebirds by refuge staff, disturbance by refuge hunters to shorebirds is expected to be negligible since most shorebird species have completely passed through Delaware by peak hunting season in November through January. Some hunting occurs when these species may be migrating before and after this peak hunting time. Shorebirds using refuge marsh habitats that are also open to hunting may be disturbed by hunters traveling in these areas or by their gunshots; however, established sanctuaries provide disturbance-free areas for migrating birds during the hunting season.

A direct beneficial impact for shorebirds is derived from seasonal closures to hunting and other public use. Minimizing human disturbance will increase nesting and foraging opportunities on overwash habitats which will subsequently increase shorebird nesting productivity. Seasonal closures of designated beach dunes and overwash areas from March 1 through September 1 are in place to minimize disturbance to nesting shorebirds such as least terns, American oystercatchers, and, potentially, piping plovers.

Indirect beneficial impacts on shorebirds are obtained by educating hunters about special beach closures with news releases and other outreach mechanisms to engage the public to understand the needs of nesting shorebirds. Public awareness and appreciation of the refuge's efforts to conserve and protect shorebirds could inspire some to volunteer or support refuge needs in the conservation and protection of critical habitats required to protect continental and hemispheric shorebird resources in perpetuity in other ways.

Impacts to Landbirds

Disturbance to landbirds has been well documented. Pedestrian travel can influence normal behavioral activities, including feeding, reproductive, and social behavior and the location of recreational activities impacts species in different ways. Miller et al. (1998) found that nesting success was lower near recreational trails, where human activity was common, than at greater distances from the trails. A number of species have shown greater reactions when pedestrian use occurred off trail (Miller et al. 1998). For songbirds, Gutzwiller et al. (1997) found that singing behavior of some species was altered by low levels of human intrusion.

Some other species, such as wood thrush, will avoid areas frequented by people, such as developed trails and buildings, while other species, particularly highly social species such as tufted titmouse, Carolina chickadee, or Carolina wren, seem unaffected or even drawn to a human presence. When visitors approach too closely to nests, they may cause the adult bird to flush exposing the eggs to weather events or predators.

Disturbance to these non-hunted migratory birds could have regional, local, and flyway effects. Regional and flyway effects would not be applicable to species that do not migrate such as most woodpeckers, and some songbirds including cardinals, titmice, wrens, chickadees, etc. We expect disturbance to non-hunted landbirds, such as feeding and resting, to increase due to an expected increase in deer hunters in new free roam hunting areas. However, the direct, indirect, and cumulative impacts of hunting on these non-hunted landbirds are expected to be negligible because the deer, upland game, and waterfowl hunting seasons are during the fall and winter months which do not coincide with the critical nesting periods of most bird species. Turkey hunting, which does occur during the nesting season of many non-hunted landbird species in April and May, is expected to have negligible impacts because hunter numbers are limited to less than five and are scattered over 3,472 acres.

Direct impacts to hunted landbirds such as quail, woodcock, and snipe are expected to remain stable since no increase in upland game hunting is expected. Hunting of resident game species such as quail does not have any regional impact on their respective populations due to their restricted home ranges. Delaware Division of Fish & Wildlife periodically reviews populations of all harvested resident species, and has determined that populations are adequate to support hunting efforts throughout the State. The refuge contributes negligibly to the State's total harvest for resident game species. For example, the number of quail taken per year has been no more than 14 per year on the refuge in recent years (Table 1.6).

Table 1.6. Number of upland game, small game, and webless migratory birds harvested and hunter visits on Prime Hook NWR.

Year	Dove Harvest	Snipe Harvest	Woodcock Harvest	Quail Harvest	Rabbit Harvest	Refuge Hunter Visits*
1996	110	0	0	5	83	126
1997	77	0	0	0	117	169
1998	30	0	0	0	46	112
1999	90	0	0	0	98	123
2000	13	0	0	0	29	81
2001	6	0	0	0	65	128
2002	58	0	0	0	163	114
2003	13	0	0	0	79	81
2004	12	0	0		75	53
2005	6	0	0	0	257	129
2006	20	0	0	14	115	106
2007	22	0	0	11	145	178
2008	0	0	1	10	176	171
2009	0	0	6	1	163	149

*Hunter visits include all species combined; majority are hunting rabbits

For migratory birds such as mourning dove, an estimated 36,300 birds were harvested in Delaware during the 2009 season (Table 1.6; Raftovich et al. 2011) when none were taken on the refuge. (Table 1.7). Similarly, very few snipe and woodcock were harvested (Table 1.7). Direct, indirect, and cumulative impacts on these species on the refuge are negligible. See [Impacts to Waterfowl](#) for a description of how the Federal and State migratory bird hunting frameworks are established.

Table 1.7. Comparison of mourning dove, woodcock, and snipe harvest at Prime Hook NWR to State, Flyway, and United States harvest in the 2009 hunting season.

Harvest Area	Dove	Woodcock	Snipe
Prime Hook NWR	0	6	0
Delaware*	36,300	200	0
Eastern Management Unit*	7,639,200	63,300	43,600
United States*	17,354,800	238,400	83,500

*Harvest estimates from (Raftovich et al. 2011); Estimates for snipe are from the Atlantic Flyway

Turkey hunting is proposed only if a huntable population is found to exist on the refuge. This will be determined through coordination with the Delaware Division of Fish & Wildlife. Currently, turkey hunting occurs in other areas of Delaware.

The hunting of deer can be a beneficial impact to landbirds. The reduction of the vegetation’s physical structure and diversity due to overbrowsing by deer also can negatively impact landbirds. Casey and Hein (1983) have found greatly reduced bird species diversity in areas with long term, high density populations of deer. These changes were mainly attributed to habitual landscape alteration with pronounced browse line and sparse cover caused by overbrowsing.

Impacts on Secretive Marsh and Waterbirds

Resident waterbirds tend to be less sensitive to human disturbance than migrants, and thus will be less impacted by disturbance from public use on the refuge. However, wading birds have been found to be extremely sensitive to disturbance in the northeastern U.S. and may be adversely impacted by disturbance from public use on the refuge (Burger 1981). The impacts of intrusion through public use are generally negligible for this group of birds, but can vary by species and between years (Gutzwiller and Anderson 1999).

Disturbance to secretive marsh birds and waders from hunting would start in September and usually end in January, unless hunting is allowed during the snow goose conservation order into mid-April. This disturbance may have direct effects on migrating and wintering secretive marsh birds and waders. However, these birds would receive added benefits from the establishment of new sanctuary areas or zones, where 3,000 acres would be protected from hunting activities that cause disturbances to secretive marsh and waterbirds.

Impacts on Fisheries

Impacts to fisheries from visitors engaged in hunting are expected to be temporary and negligible. Increased deer and waterfowl hunting on Prime Hook Creek and Unit III impoundments will cause increased suspension of bottom sediments from boat motors. However, since hunting occurs during the fall and winter months, this sediment suspension should not adversely affect biological oxygen demand (BOD) for fisheries resources. Early season hunters may harm submerged or emergent vegetation by accessing small ditches, which may cause negligible adverse impacts to protective cover for fisheries based on past observations of these impacts from refuge staff. Effects on interjurisdictional fishes are expected to be unlikely from hunting because the majority of the refuge will experience minimal, transitory use by hunters.

Impacts on Mammals

In general, the presence of humans will disturb most mammals, which typically results in indirect negligible short-term adverse impacts without long-term effects on individuals and populations.

Adverse impacts on resident game populations from hunting would be negligible. The Delaware Division of Fish and Wildlife periodically reviews populations of all harvested resident species and has determined that populations are adequate to support hunting efforts throughout the State. Hunter visits and harvest of upland and small game such as rabbit on the refuge have been relatively low (Table 1.6) and impacts are expected to be negligible. The refuge does not allow hunting of eastern gray squirrel to minimize conflicts with endangered Delmarva fox squirrel.

Overall impacts from hunting on non-hunted mammals, such as voles, moles, mice, shrews, and bats, are expected to be negligible. Since small mammals are less active during winter when hunting season occurs, and since these species are mostly nocturnal, hunter interactions with small mammals are very rare. Vehicles are restricted to roads and harassment or taking of any wildlife other than legal game species is not permitted. Impacts of hunting to migratory bat species would be negligible. Except for some species of migratory bats, these species have very limited home ranges and hunting would not affect their populations regionally. These species are in torpor or have completely passed through Delaware by peak hunting season in November through January. Some hunting occurs during September-October and March-April when these species are migrating; however, hunter interaction would be commensurate with that of non-consumptive users.

The Delaware Division of Fish and Wildlife recently finalized a new statewide 10-year deer management plan (Rogerson 2010). The plan was created with input from a 22-member advisory group, a public phone attitude survey, a mail survey to hunters, comments solicited from the general public, and technical reviews from deer experts outside the division. The resulting plan identifies population objectives based on habitat capability and societal tolerances.

Prime Hook NWR is located in the State's deer management zone 9, which encompasses the northeastern coastal portion of Sussex County (Rogerson 2010). The Division of Fish and Wildlife manages deer populations, in part, through recreational hunting. Based on their monitoring programs, the Division of Fish and Wildlife adjusts hunting levels in terms of season length, sex ratio in the harvest, and number of hunters (tag availability) to move population levels toward desired objectives. Of course, other factors such as disease, severe weather, predation, and automobile collisions influence mortality are taken into account by annual monitoring.

Delaware deer herd statistics indicate that the deer density in zone 9 was estimated in 2009 at 22.5 deer per square mile with a variability of plus or minus 20.75 percent (Rogerson 2010). This is a decrease of 58 percent from the 2005 estimated density of 39.2 deer per square mile (Rogerson 2010). The total Statewide post-hunting season deer population in 2005 was estimated at 37,563 deer, while in 2009 it was estimated at 31,071 deer, a 17.3 percent Statewide reduction. Major land use changes over the last 100 years have created a deer herd that exceeds normal deer densities of 10 to 20 deer per square mile.

High deer numbers are associated with crop damage, reduction of some forest understory species, and reduction of reforestation seedling survival, which all impact habitat that is important for a variety of wildlife. White-tailed deer hunting is the single most important public use on the refuge that would impact mammals, including deer, and other forest-dependent wildlife. It serves both as a wildlife-dependent recreational use and a method to reduce and stabilize deer densities. This benefits other mammals, including the endangered Delmarva fox squirrel.

Based on a nationwide survey of all states (Krausman 1992), deer populations are effectively controlled with hunting and habitat manipulation in many areas where they were overpopulated. In a 10-year study in northwestern Pennsylvania examining the impacts of varying densities of deer on deer health and habitat, starvation mortality resulted when densities reached higher than 25 deer per square kilometer (247 acres). Also, no prevention or control of epizootic hemorrhagic disease exists to date except by keeping populations below the carrying capacity of their habitats. Such breakouts have occurred on the refuge in the past. Based on these considerations, it is anticipated that hunting would have short-term and long-term minor-to-moderate beneficial impacts on deer health and quality and habitat condition.

Hunting resident game species on the refuge, such as deer, will result in negligible impacts on their populations because of their restricted home ranges. The refuge contributes negligibly to the State's total harvest for resident game species (figure 1.1 and tables 1.8 and 1.9). For example, since 1999, deer harvest at the refuge has ranged from 0.8 percent to 1.5 percent of Delaware's total deer harvest each year. The current harvest level of deer on the refuge (107) has a negligible impact on the Statewide deer population of 31,071 deer (Table 1.9). Given the low numbers of animals harvested from the refuge in respect to the total Statewide harvest and deer population, no cumulative impacts to local, regional, or Statewide populations of white-tailed deer are anticipated from allowing hunting of the species on the refuge. Additional information on the status of the Delaware deer herd and the Delaware hunting program can also be found in the refuge Hunt Plan (appendix C).

Figure 1.1. Delaware annual deer harvest, 1954 – 2008/09 seasons. (Source: Rogerson (2010))

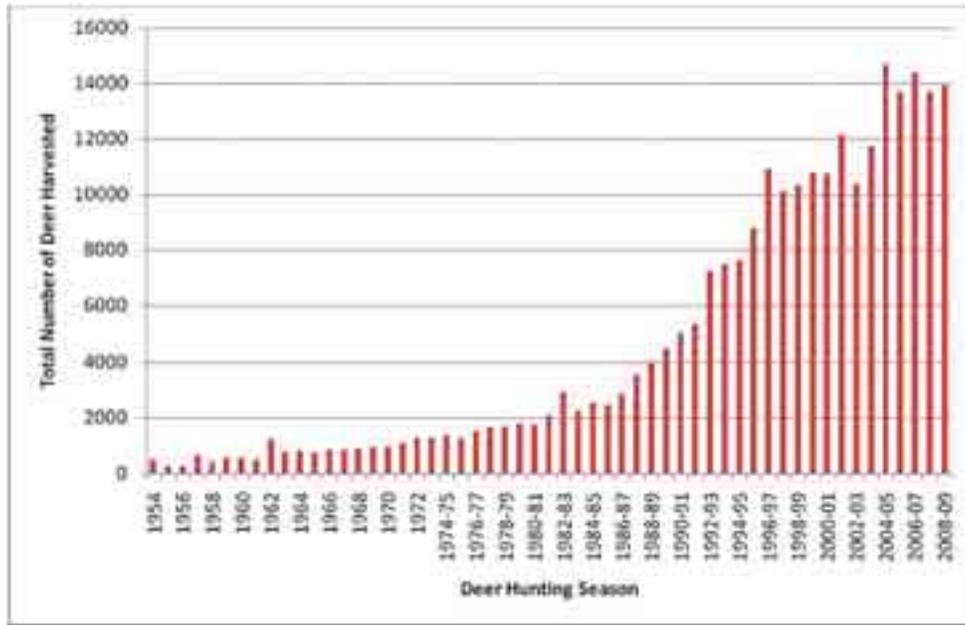


Table 1.8. Number of deer harvested and hunter visits on Prime Hook NWR compared to statewide harvest (Source: Refuge harvest data; <http://www.dnrec.state.de.us/fw/deer.pdf>; <http://www.fw.delaware.gov/Hunting/Documents/2007-08%20Historical%20Delaware%20White-tailed%20Deer%20Summary.pdf>)

Year	Statewide Deer Harvest	Refuge Deer Harvest	Refuge Hunter Visits
1988	3,998	141	1,289
1989	4,504	155	1,131
1990	5,066	178	1,689
1991	5,336	163	1,703
1992	7,245	257	1,608
1993	7,465	219	1,616
1994	7,615	169	1,568
1995	8,781	217	1,184
1996	10,915	221	1,326
1997	10,091	187	1,510
1998	10,312	138	1,335
1999	10,756	114	870
2000	10,741	125	941
2001	12,133	188	1,003
2002	10,357	160	913
2003	11,712	175	891
2004	14,669	143	841

2005	13,670	133	884
2006	14,401	120	825
2007	13,369	108	790
2008	13,926	106	670
2009	12,400*	107	552

*Data from DNREC (2010b).

Table 1.9. Cumulative impacts of existing deer hunting on Prime Hook NWR/State Deer Management Zone 9 (2009-2010 data) compared to Statewide Harvest.

Hunt Location & Type	Harvest
Prime Hook NWR	107
State Deer Management Zone 9	767
Statewide Harvest (all 17 Deer Management Zones)	12,400

Delaware permits hunting for red fox, which assists State management efforts in reducing the incidence of mange outbreaks to maintain a healthy population and reducing the predatory impact of this species on migrating and breeding birds, particularly State and federally endangered or threatened species. Hunting would be opportunistic in most cases. In other states, the incidental harvest of fox occurs during other open seasons such as deer season and the pelts are often retained for personal use. Though no county-specific data are available, healthy populations of fox exist in the State and anticipated harvest rates would result in negligible impacts to local or State populations (Reynolds, personal communication 2010).

Impacts to Amphibians and Reptiles

The direct, indirect, and cumulative effects of hunting to amphibians and reptiles such as snakes, skinks, turtles, lizards, salamanders, frogs, and toads are expected to be negligible. Hibernation or torpor by cold-blooded reptiles and amphibians limits their activity during the hunting seasons for deer, waterfowl, and upland game when temperatures are low and hunters would rarely encounter them during most of the hunting season. Turkey season occurs during the warmer months of April and May; however, the impact of turkey hunters is expected to be negligible because hunter numbers are limited to less than five and are scattered over a large area.

Impacts to Invertebrates

Impacts to invertebrates such as butterflies, moths, other insects, and spiders are expected to be negligible. Invertebrates are not active during the majority of the hunting seasons and would have few interactions with hunters during the hunting season.

Impacts on Public Use and Access

Public opportunities to hunt on the Delmarva Peninsula are decreasing with increasing private land development. Refuge lands have become increasingly important in the region as a place to engage in this activity. A recent study found that 78% of hunters in Delaware hunt on private land (U.S. Department of the Interior 2006). When asked the importance of hunting activities in the USGS Visitor and Community Survey (Sexton et. al 2007), a little over half of responses were rated as moderately to very important. Both consumptive and nonconsumptive use visitors reported that being in a natural, undeveloped area and experiencing a serene environment are equally important to their refuge experience as well as the trails that afford this opportunity (Sexton et. al 2007).

Hunters have the opportunity to harvest a renewable resource in a traditional manner, which is culturally important to the local community. Refuge lands allow the public to enjoy hunting at no or little cost in a region where private land is leased for hunting, often costing a person several hundred to several thousand dollars per year for membership. Refuge hunting programs also make special accommodations for mobility-impaired hunters and youth hunters, which provide opportunities to experience a wildlife-dependent recreational activity, instill an appreciation for and understanding of wildlife, the natural world and the environment and promote a land ethic and environmental awareness.

The moderate beneficial impacts of providing the existing level of wildlife-dependent activities, with some modest increases, include helping meet existing and future demands for outdoor recreation and education, as documented in the State Comprehensive Outdoor Recreation Plan (DNREC 2003) and in the Visitor and Community Survey (Sexton et. al 2007). Visitors interested in hunting would find high quality opportunities to engage in their favored pastime. Visitor use is increasing over time as local residents and visitors become increasingly aware of Refuge opportunities, and as we progress in creating new facilities and programs. The economic benefits of increased tourism likely would also benefit local communities. There are also hunting opportunities for individuals with disabilities.

The refuge would also be promoting a wildlife-oriented recreational opportunity that is compatible with the purpose for which the refuge was established. The public would have an increased awareness of the refuge and the National Wildlife Refuge System and public demand for more areas to hunt and learn about wildlife would be met. Over time, it is reasonable to believe that public awareness of the refuge would increase, and, in turn, visitation would increase on the areas open to hunting. The refuge may or may not be capable of meeting the demand as it increases and would depend on staffing levels and the availability of partners and volunteers to assist.

Eventually, the level and means of use resulting from this increase in visitation could change the nature of the experience for many visitors. Some may choose either to forgo hunting due to issues of crowding or behavior, or to go elsewhere. Because the refuge provides opportunities now for only a small portion of the area's hunters, if that shift occurs, it is not imminent and would likely occur outside the 15 year life of the Comprehensive Conservation Plan. If it does occur, it could put additional strains on other public lands, or diminish the refuge contribution to the mission of the Refuge System. We would work to avoid that by continuing to distribute our programs and facilities to minimize conflicts among users.

The hunting program for deer, waterfowl, upland game and webless migratory birds (dove), and turkey provides an administratively simple program that balances other public use activities, supports Presidential Executive Order: Facilitation of Hunting Heritage and Wildlife Conservation and regional directives, parallels State hunting regulations, provides seasonal closures to minimize wildlife disturbance and/or avoid conflicts with other uses, eliminates hunting fees except for lottery hunts, enhances disabled hunting opportunities, and further develops an appreciation for fish and wildlife. The number of hunters that will participate in refuge hunting opportunities varies annually; however, it is anticipated that a slight increase from current levels will occur.

Preseason lottery drawings at the refuge provide hunting opportunities for local, in-State, and out-of-State hunters. Knowing in advance of a hunting opportunity allows hunters to prepare, plan, and scout, which ultimately helps to provide a quality hunting experience.

Hunting areas will be closed to other public uses, unless the other public uses can be safely sequestered to other locations separate from the locations of hunting activity. Experience has proven that time and space zoning (e.g., establishment of separate use area, use periods, and restriction on the number of users) is an effective tool in eliminating conflicts between user groups. Seasonal closures apply to non-consumptive users during the hunting season, which is typically a slower period of use due to weather conditions. Short-term, moderate adverse impacts are expected for non-consumptive users due to the seasonal closures that are highlighted below:

- 1) Western Prime Hook Creek (from old shop ramp to Waples Pond) (Unit III): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 2) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp) (Unit III): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 3) Headquarters Area (includes Turkle & Fleetwood Ponds) (Unit III): Closed only for a maximum of two days for deer hunts.

- 4) The northern portion of Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 5) Hiking Trails on Fowler Beach Road (Unit I), Prime Hook Road (Unit III), and Slaughter Beach Road and Slaughter Canal (Unit I): Closed on Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.

According to the USGS Visitor and Community Survey (Sexton et. al 2007), the overall mean desirability of additional hunting opportunities was not as high as that of other public use activities. However, upon further breakdown between hunters and non-hunters, the additional hunting opportunities listed were very desirable by the hunting community.

The improvement of habitat quality from ongoing habitat management projects would likely result in an increase in some game populations and positively affect the hunting experience for many. Considerable change in the regulations and methods and practices of hunting, hunters will encounter some disruption of their expectations and routines.

White-tailed deer hunting: A total of 5,389 acres is open for deer hunting, which includes archery (to include the use of crossbows), muzzleloader, handgun, and shotgun hunting. Seasonal closures would occur to not only protect wildlife, but also to minimize conflicts between different hunting activities and/or other non-consumptive recreational uses (e.g., minimize conflict with anglers on Prime Hook Creek, offset hunting days for deer and waterfowl hunting on Prime Hook Creek and for disabled hunters in the disabled hunt area; close hunting in late November in designated areas to minimize bald eagle and waterfowl disturbance). Disabled hunting areas in Unit III and IV would limit access to individuals who are permanently confined to a wheelchair, which ensures quality opportunities for hunters with limited mobility.

The refuge proposes to open 1,513 additional acres for deer hunting which includes an area located north of Prime Hook Road commonly referred to as Oak Island, an area of red maple swamp along Prime Hook Creek and west of the existing Headquarters Area, an area north of Route 16 referred to as the Millman Tract, and an expansion of the Headquarters Area. Of these "new areas," Oak Island was previously hunted up until 1995 and the Millman Tract was hunted under private ownership up until the Service purchased it in 2001. Prime Hook Creek and its associated red maple swamp will provide additional opportunities and will be limited by access. Hunter numbers are expected to initially increase based on the opening of these areas and the opportunity for hunters to free-roam; however, cumulative impacts are expected to be negligible.

Permanent deer hunting stands will be phased out over a five-year period in all areas except the disabled hunting area. We will limit the number of permits to approximately 30 in the lottery hunt area to minimize hunter conflict in an area historically known to attract large hunter numbers. In the regular hunt area, hunting will be open every day during designated seasons (except the October antlerless and handgun seasons).

The phasing out of all permanent deer hunting stands (except non-ambulatory hunt blinds) will require hunters to find a suitable hunting location within designated hunting areas through effective scouting. Use of portable deer climbing stands is recommended but not required. Hunters have expressed an interest in scouting and choosing their hunting locations to enhance the quality of their hunt. Maintenance mowing will no longer occur to provide trails to facilitate hunting. Minor to moderate short-term adverse impacts are expected among hunters over desired hunting locations and we will continue to encourage proper hunting ethics.

Waterfowl hunting: A total of 3,455 acres is open to migratory bird hunting, which is 40% of the refuge (includes lands purchased with Land and Water Conservation Funds which are excluded from the 40% rule). Seasonal closures would occur to not only protect wildlife, but also to minimize conflicts between different hunting activities and/or other non-consumptive recreational uses (e.g., offset hunting days for deer and waterfowl hunting on Prime Hook Creek and for disabled hunters in the disabled hunt area; close hunting in late November in designated areas to minimize bald eagle and waterfowl disturbance, provide access for non-consumptive users on Sundays during the hunting season). In the lottery hunt area, hunting will occur three days per week and cease at noon. In the regular hunt area, hunting will be open every day during all waterfowl hunting seasons. Although the loss of one hunting day per week and an earlier closure at noon rather than the current 3:00pm will not be

well received by the hunting public; this perceived decrease in hunting is offset by the additional 1,732 acres being proposed to open under this alternative for waterfowl hunting.

This additional hunting acreage includes: an area between Slaughter Beach Road and Fowler Beach Road referred to as Unit I, an area located south of Prime Hook Road, Prime Hook Creek, an area along the Broadkill River in Unit IV, and a reconfiguration of the existing waterfowl hunt area in Unit III. Of these “new areas,” Unit I was already open to dove hunting and Prime Hook Creek was hunted up until 1991. Hunter numbers are expected to initially increase based on the opening of these areas and the opportunity for hunters to free-roam in the regular waterfowl areas; however, cumulative impacts are expected to be negligible.

Although the permanent waterfowl blinds on the refuge will be phased out over a five-year period, we still require hunters in the lottery hunt area to hunt within a defined area around a designated blind site (marker). This will minimize hunter conflict in an area historically known to attract large hunter numbers. In past years for daily drawings on opening days, it was common to see over 60 to 80 duck hunting parties compete for 27 available hunting opportunities.

The phasing out of all permanent waterfowl hunting blinds (except non-ambulatory blinds) in lieu of blind sites in the lottery hunt area will now require hunters to provide their own means to camouflage themselves (e.g., boat blind, pop up blind, etc.). Hunters would be required to find a suitable hunting location within a specified area around the blind site marker. Hunters have expressed an interest in scouting and having the flexibility to adjust their hunting locations for weather conditions to enhance the quality of their hunt. In free roam areas, hunters may hunt anywhere in the designated area. Minor to moderate short-term adverse impacts are expected among hunters over desired hunting locations and proper hunting ethics will be encouraged.

The creation of sanctuaries in Unit III will result in the elimination of 6 hunting blinds from the 19 available federal blinds; however 9 new blinds sites will be added. These 9 new blinds sites, which include a wheelchair accessible blind, brings the total number of federal blind sites to 22 and does not include the 8 blinds on the state owned Prime Hook Wildlife Area. The addition of new free-roam waterfowl hunting areas in salt marsh habitats in Unit I and IV will also provide quality opportunities.

Upland game and webless migratory bird hunting: A total of 1,957 acres are available for hunting of upland game and webless migratory birds. Dove hunting will not be open on 105 of these acres, which should affect few hunters.

Wild turkey hunting: A total of 3,472 acres are open for hunting wild turkey until noon on selected hunt days. In recent years, hunter and staff observations indicate that a huntable population of turkeys may exist on the refuge. Limited opportunities exist on public lands to hunt turkey and the refuge may contribute to providing additional quality opportunities for hunters.

The refuge would collaborate with the Delaware Division of Fish & Wildlife to evaluate the status of the wild turkey population on the refuge. Hunting will be permitted if State and refuge personnel determine that the turkey population in the area is sufficient to support hunting on the refuge. It is anticipated that a limited number of hunters (less than five per year). Permits would be issued through pre-season lottery drawing. The elimination of nearly all hunting permit fees (except for lottery hunts) should be well received by hunters. An administratively simplified hunting program minimizes the amount of staffing resources needed to conduct the hunt by as much as 54 staff days and by \$17,890 from the previous program and thereby reduces the administrative burden and minimizes the amount of staffing resources needed to conduct the hunt. The minor beneficial impact to the hunter is a reduction in the cost to hunt.

Fees are required to manage the lottery hunts for deer, waterfowl, and turkey. The refuge Recreation Act requires that funds are available for the development, operation, and maintenance of the permitted forms of recreation. The permit fee (\$10 for deer and turkey; \$15 for waterfowl), pre-season application fee (\$5/hunter), and processing fee for permits acquired after the pre-season drawing (\$2-3 per hunt) are the minimal amounts needed to offset the cost of facilitating the pre-season drawings and manage the lottery hunts. Due to the uncertainty in the level of hunter participation in future years, permit fees may need to be adjusted (increased

or decreased) and therefore will be evaluated. Preseason lottery drawings will be administered by a contracted company which will collect information and required fees, conduct the drawing, and issue the permits. This may reduce our costs by over \$3,000 and application and processing fees will be paid to the contractors for administering this permitting process. Refuge staff will work with the contractor to provide the highest level of customer support to refuge users. New fees for preseason application for waterfowl and turkey hunting, new processing fees for standby permits, and charging a flat blind fee for waterfowl rather than an individual fee are anticipated to be unpopular with the hunting public.

Expanding hunting opportunities is expected to have moderate adverse impacts on a certain segment of the public that does not desire any change in public use programs and regulations, or that may hold differing views on the course of action. In addition, while new visitors become familiar with those changes, violations could increase. Some conflict between wildlife observers, photographers, students, and other refuge users is expected to result in short-term, moderate adverse impacts, which will be managed through seasonal closures. Negative reactions by some visitors may be caused by the closure of the western end of Prime Hook Creek to all uses (mainly fishing, canoeing, and kayaking) other than hunters from September 1 through the end of the deer and waterfowl hunting seasons; the closure of the eastern end of Prime Hook Creek from September 1 through March 15; and the temporary closure of the general public use area near the Refuge Headquarters to conduct deer hunts. Seasonal closures for hunting occur during the fall and winter months, which is typically a slower period of use due to weather conditions. Refuge officers would enforce these and other current refuge regulations, where appropriate, and would seek the assistance and cooperation of Delaware Division of Fish & Wildlife in enforcing common regulations, to provide a safe environment for refuge visitors and promote activities that are compatible with protecting the resources.

Dome conflict between concurrent hunting programs is anticipated (e.g., waterfowl, deer, and upland game hunting seasons overlapping). For the majority of the hunting seasons, the Delaware Division of Fish & Wildlife has made efforts to avoid these overlaps in the various hunting programs. As public use levels expand across time, unanticipated conflicts between user groups may occur. The refuge's visitor use programs would be adjusted as needed to eliminate or minimize each conflict and provide quality wildlife-dependent recreational opportunities. The Service's law enforcement efforts will be increased.

The refuge would work closely with State, Federal, and private partners to minimize impacts to adjacent lands and its associated natural resources. Due to an increase in new hunting areas and by allowing hunters to free roam, an increase in violations may occur until hunters become familiar with the refuge boundaries and regulations. As a result some landowner conflicts may erupt due to hunter trespassing. These minor short-term adverse impacts will be minimized through enhanced law enforcement efforts. For example, waterfowl hunting zones in Unit IV along the Broadkill River have the potential to conflict with nearby existing blinds on private lands. This activity will be evaluated and zones adjusted accordingly. Hunters will most likely opt to hunt within the marsh areas of these zones and not along the Broadkill River, which would lessen any direct conflicts with hunters on these nearby private lands.

Refuge Facilities: Minimal infrastructure, which includes the addition of two to three parking areas, enhancement of existing boat ramps, and placement of informational signs, is anticipated in support of this priority public use. There would be some costs associated with these programs in the form of road maintenance, law enforcement, and boat ramp maintenance. These costs should be minimal relative to total refuge operations and maintenance costs and would not diminish resources dedicated to other refuge management programs. Impacts to refuge resources are expected to be negligible.

Other Past, Present, Proposed, and Reasonably Foreseeable Actions and Anticipated Impacts

Cumulative effects on the environment result from incremental effects of a proposed action when these are added to other past, present, and reasonably foreseeable future actions. While cumulative effects may result from individually minor actions, they may, viewed as a whole, become substantial over time. The proposed hunt plan has been designed to be sustainable through time given relatively stable conditions.

Due to hunting history of low hunter use and harvest for resident geese and late season snow geese, the refuge has been closed during these seasons but will consider reopening if demand and opportunity exist and conflicts are minimized.

Greater snow geese have undergone a dramatic increase in recent decades, to current population estimates of over 1 million birds. Natural marsh habitats on some migration and wintering areas have been impacted by the destructive feeding strategies of overabundant light geese (Giroux and Bedard 1987, Giroux et al. 1998, Widjeskog 1977, Smith and Odum 1981, Young 1985). In addition, goose damage to agricultural crops has become a problem (Bedard and Lapointe 1991, Filion et al. 1998, Giroux et al. 1998, Delaware Div. of Fish and Wildlife 2000). Snow geese use the refuge wetland habitats extensively, and are not subjected to any hunting disturbance or mortality on the refuge. Impacts to refuge wetlands and impacts to wetland-dependent wildlife increase over time if the population is not adequately controlled at the flyway level, through the coordinated efforts of individual agencies.

Similarly, resident Canada geese have been shown to cause changes in wetland community structure (Laskowski et al. 2002). Resident geese can reduce the amount of plant biomass that would be available to migrant birds at the end of the growing season. Direct damage to agricultural resources by resident geese includes grain crops, trampling and spring seedlings. Heavy grazing by geese can result in reduced yields and in some instances a total loss of the grain crop (Allen et al. 1985, Flegler et al. 1987). Thus, uncontrolled Canada goose populations on the refuge can affect migratory bird populations utilizing the refuge as well as contribute to agricultural losses on lands surrounding the refuge.

The refuge will consider participating in additional deer hunting seasons if an overabundance of deer arises, as determined the Delaware Division of Fish & Wildlife (DFW) and concurrence by the refuge (Refer to Resident Wildlife Section for impacts of deer overabundance).

If visitation levels expand in the unforeseen future, unanticipated conflicts between user groups may occur. Service experience has proven that time and space zoning (e.g., establishment of separate use areas, use periods, and restrictions on the number of users) and limiting visitations are effective tools in eliminating conflicts between user groups.

Anticipate Impacts if Individual Actions are Allowed to Accumulate

National Wildlife Refuges, including Prime Hook NWR, conduct hunting programs within the framework of State and Federal regulations. Hunting at the refuge is at least as restrictive as the State of Delaware and in some cases more restrictive. By maintaining hunting regulations that are as, or more, restrictive than the State, individual refuges ensure that they are maintaining seasons which are supportive of management on a more regional basis. Additionally, the refuge coordinates with the DFW annually to maintain regulations and programs that are consistent with the states' management programs.

The cumulative impact of hunting on migratory and resident wildlife populations at Prime Hook NWR is negligible. As described in the previous sections, the proportion of the refuge's harvest of waterfowl, deer, and small game is negligible when compared to local, regional, and flyway populations and harvest.

Because of the regulatory process for harvest management of migratory birds in place within the Service, the setting of hunting seasons largely outside the breeding seasons of resident and migratory wildlife, the ability of individual refuge hunt programs to adapt refuge-specific hunting regulations to changing local conditions, and the wide geographic separation of individual refuges, we anticipate no direct or indirect cumulative effects on resident wildlife, migratory birds, and non-hunted wildlife of hunting on Prime Hook NWR.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the refuge's Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*, a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage the hunt program in accordance with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that the program is providing a safe, high quality hunting experience for participants. The refuge based these stipulations on our draft CCP and Environmental Impact Statement on Hunting, Hunting Management Plan, and refuge-specific regulations (See Description of Use section).

To ensure compatibility with refuge purposes and the mission of the National Wildlife Refuge System, hunting can occur on the refuge if the refuge-specific regulations highlighted in this document and following stipulations are met:

- This use must be conducted in accordance with State and federal regulations, and special refuge regulations published in the refuge Hunting Regulations and Public Use Regulations brochures.
- A network of waterfowl sanctuaries will be maintained to ensure that migratory birds have adequate resting and feeding areas while hunting seasons are occurring.
- This use is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats.
- Law Enforcement Officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Law Enforcement personnel will monitor all areas and enforce all applicable State and Federal Regulations.
- The refuge manager may, upon annual review of the hunting program and in coordination with the Delaware Division of Fish and Wildlife, impose further restrictions on hunting, recommend that the refuge be closed to hunting, or further liberalize hunting regulations within the limits of state seasons and regulations. Hunting restriction may be implemented if it conflicts with other, higher priority refuge programs or endangers refuge resources or public safety.

JUSTIFICATION:

Hunting is a priority wildlife-dependent use for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and The National Wildlife Refuge System Administration Act of 1966, as amended by 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 ensure that they receive enhanced attention during planning and management.

Hunting seasons and bag limits are established by the State of Delaware and generally adopted by the refuge. These restrictions ensure the continued well-being of overall populations of game animals. Hunting does result in the taking of many individuals within the overall population, but restrictions are designed to safeguard an adequate breeding population from year to year. Specific refuge regulations address equity and quality of opportunity for hunters, and help safeguard refuge habitat. Disturbance to other fish and wildlife does occur, but this disturbance is generally short-term and adequate habitat occurs in adjacent areas. Loss of plants from boat or foot traffic is minor, or temporary, since hunting occurs mainly after the growing season.

Conflicts between hunters are localized and are addressed through law enforcement, public education, and continuous review and updating to State and refuge hunting regulations. Conflicts between other various user groups are minor given the season of the year for hunting, the location of most hunting away from public use facilities, and seasonal area closures.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the National Wildlife Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

This activity will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purpose for which the Refuge was established.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE:

LITERATURE CITED:

See CCP Bibliography.

COMPATIBILITY DETERMINATION

USE:

Wildlife Observation, Wildlife Photography, Environmental Education, and Interpretation

REFUGE NAME:

Prime Hook National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

1. Migratory Bird Conservation Act {16 U.S.C. 715d}
2. Refuge Recreation Act {16 U.S.C. 460 K-1}

REFUGE PURPOSE(S):

1. "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds..." {16 U.S.C. 715d; Migratory Bird Conservation Act}
2. "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
3. "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
4. "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the 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.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is wildlife observation, wildlife photography, environmental education, and interpretation. These are priority public uses identified by Executive Order 12996 (March 25, 1996) and by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?

The use would be conducted within the refuge's 10,132 acres, which lie between Slaughter Beach and the Broadkill River along the southeastern coastline of Delaware. In all four units, we plan to highlight viewing areas along the State roads (Slaughter Beach Road, Fowler Beach Road, Prime Hook Road, and Broadkill Road) in an interpretive auto tour route, where a visitor can access information about the refuge using advanced technology (radio, compact disc, cell phone, downloadable programming, etc.). Designated areas open to visitors for wildlife observation, photography, environmental education, and interpretation are as follows (see Map 4-15 for an illustration of where these uses would be conducted on the refuge):

Unit I (Slaughter Beach Road to Fowler Beach Road): Wildlife observation and photography are the primary uses at designated areas at Fowler Beach, Slaughter Canal, and along the roadsides of Slaughter Beach Road and Fowler Beach Road. This area includes interpretive signs at Fowler Beach, information kiosks (one at Slaughter Beach and two on Fowler Beach Road), parking areas, and an unimproved boat ramp on Fowler Beach Road. Access to the Slaughter Canal is by boat only. We plan to provide access to existing interior roads and trails on the north side of Fowler Beach Road and south side of Slaughter Beach Road for wildlife observation and photography opportunities. A new parking area will be established on the north side of Fowler Beach Road.

Unit II (Fowler Beach Road to Prime Hook Road): Wildlife observation and photography are the primary uses at Slaughter Creek on Cods Road and roadside pull-offs along Prime Hook Road. The area includes two information kiosks on Prime Hook Road and parking areas. We plan to provide access to an existing interior road on the south side of Fowler Beach for wildlife observation and photography opportunities by adding a wheelchair accessible photography blind near a restored wetland area. Visitors can use the new parking area mentioned in the Unit I description. Access to the north side of Fowler Beach Road will be from the existing interior road and trail network.

Unit III (Prime Hook Road to Broadkill Beach Road): Wildlife observation, photography, environmental education, and interpretation are important uses in this area of the refuge. The majority of the public use infrastructure is located near the refuge headquarters. This area includes 5.1 miles of hiking trails (Blue Goose Trail, Photography Blind Trail, Dike Trail-wheelchair accessible, Black Farm Trail, Pine Grove Trail, and Boardwalk Trail-wheelchair accessible); canoe trail on Prime Hook Creek and the Headquarters Canal Ditch; Turkle and Fleetwood Ponds; Goose & Flaxhole Ponds; Petersfield Ditch; trailhead kiosks; informational kiosks (one in partnership with Delaware Division of Fish and Wildlife on Little Neck Road); highway direction signage; parking areas; restrooms; a photography blind; wheelchair accessible observation platform (Dike Trail); wheelchair accessible fishing pier (Fleetwood Pond); numerous interpretive signs and kiosk maps; Visitor Contact Station containing interpretive displays and various mounted animal species; four refuge boat ramps; roadside pull-offs along Broadkill Beach Road; refuge auditorium; an environmental education pavilion; wildlife observation and photography opportunities through special events, programs, and benches along hiking trails. The areas immediately surrounding the refuge office and associated trails provide opportunities for environmental education. We also participate in off-refuge events in Milton, such as the Horseshoe Crab-Shorebird Festival and the Youth Fishing Event.

We plan to enhance opportunities in this area by extending the trail network near the deer check station to provide additional parking and hiking opportunities; developing new facilities for environmental education and visitor services programs; and providing access to existing interior roads and trails on the south side of Prime Hook Road and near Goose Pond (off Deep Branch Road) for wildlife observation and photography opportunities.

Unit IV (Broadkill Beach Road to Broadkill River): Wildlife observation and photography are the primary uses in this area. This area includes roadside pull-offs along Broadkill Beach Road. We plan to reevaluate the trail and observation platform overlooking Vergie's Pond.

(c) When would the use be conducted?

Except as noted below, the refuge is open for wildlife observation, wildlife photography, environmental education, and environmental interpretation in the following areas everyday from open one-half hour before sunrise to one-half hour after sunset. Some areas are seasonally restricted to minimize conflict among user groups and to minimize wildlife disturbance.

- 1) Designated beach dunes and overwash areas (Units I & II): Closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.
- 2) Western Prime Hook Creek (from old shop ramp to Waples Pond) (Unit III): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.

- 3) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp) (Unit III): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 4) Headquarters Area (includes Turkle & Fleetwood Ponds) (Unit III): Closed only for a maximum of two days for deer hunts.
- 5) The northern portion of Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 6) Hiking Trails on Fowler Beach Road (Unit I), Prime Hook Road (Unit III), and Slaughter Beach Road and Slaughter Canal (Unit I): Closed except for Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
- 7) Roadside pull offs and water control structures/fishing areas at Petersfield Ditch (Unit III), Slaughter Canal (Unit I) & Cods Road (Unit II): Open year round.

(d) How would the use be conducted?

These four priority public uses would be allowed on established roads, trails, parking areas, and in buildings that have been designed to accommodate such uses and in areas that are least sensitive to human intrusion. Uses would be conducted for the general public, as well as for organized groups, including schools and scout groups. Brochures and maps depicting the roads and trails open for these uses are available at the Visitor Contact Station and on the refuge's website.

Environmental education and interpretation will be conducted by way of personal presentations by staff and volunteers, teachers and other youth leaders, and at special events and displays both on and off the refuge. Educational and interpretive information will also be provided via signage, kiosks, printed information, exhibits, audiovisual presentations, and lecture programs. Wildlife observation and photography are self-conducted and are facilitated through the availability of trails, viewing areas, tours, and informational materials. Wildlife observation programs such as birding field trips, canoe trips, and other nature walks are frequently given. Viewing scopes are provided in designated areas. The refuge also promotes wildlife photography with the Friends of Prime Hook NWR through the annual nature photography contest and exhibition.

Refuge staff are responsible for on-site evaluations to resolve public use issues; monitor and evaluate impacts; maintain boundaries and signs; meet with interested public; recruit volunteers; prepare and present interpretive and educational programs; maintain existing trails and viewing areas; revise leaflets and develop new information materials, install and/or update kiosks; develop needed signage; organize and conduct refuge events; conduct regularly scheduled programs for the public; display off-site exhibits at local events; develop relationships with media; provide law enforcement and security; and respond to public inquiries.

Boats enter refuge waters from access points on Slaughter Canal at Fowler Beach Road, at Waples Mill Pond on the Brumbley Family Campground, at the office boat ramp, at the ramp at the old maintenance facility, at suitable sites on Goose and Flaxhole Ponds, and at boat ramps at Turkle and Fleetwood Ponds.

At Fowler Beach, access for these activities will occur only on refuge owned lands on the sandy part of the beach from the toe of the dunes to the Delaware Bay (mean high water demarcation to mean low water demarcation). One parking lot with a dune crossover provides access to the beach. Access on the dune and adjacent marshes is prohibited.

In addition to published 50CFR regulations and State regulations, refuge-specific regulations also apply for Wildlife Observation & Photography, Environmental Education & Interpretation and are as follows:

- 1) No refuge-specific permits are required.
- 2) All boats must be off the water at sunset.

- 3) Boat motor restrictions
 - a) 30 horsepower motor restriction on Prime Hook Creek and Slaughter Canal
 - b) Electric motors or manual propulsion only on Turkle & Fleetwood Ponds
 - c) Manual propulsion only on Goose & Flaxhole Ponds
 - d) Air thrust boats and jet skis are not permitted
 - e) A “Slow No Wake” zone of one-half mile has been established on the Headquarters Ditch.
- 4) Areas may be closed on the refuge without prior warning.
- 5) Visitors must stay on the designated trail routes and areas.
- 6) Except as noted below, the refuge is open for wildlife observation, wildlife photography, environmental education, and environmental interpretation in the following areas everyday from open one-half hour before sunrise to one-half hour after sunset. Some areas are seasonally restricted to minimize conflict among user groups and to minimize wildlife disturbance.
 - a) Designated beach dunes and overwash areas: Closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.
 - b) Western Prime Hook Creek (from old shop ramp to Waples Pond): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - c) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - d) Headquarters Area (includes Turkle & Fleetwood Ponds): Closed only for a maximum of two days for deer hunts.
 - e) The northern portion of Unit IV (includes trail overlooking Vergie’s Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - f) Hiking Trails on Fowler Beach Road, Prime Hook Road, and Slaughter Beach Road and Slaughter Canal: Closed except for Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - g) Roadside pulloffs and water control structures/fishing areas at Petersfield Ditch, Slaughter Canal & Cods Road: Open year round.
- 7) Dog walking is not permitted on the refuge.
- 8) Bicycling is allowed only on roads open to public vehicular traffic.
- 9) The Visitor Contact Station is open weekdays from 7:30am to 4:00pm and seasonally on weekends.
- 10) The following activities are prohibited, including, but not limited to: ice skating, camping, roller blading, horseback riding, geocaching/metal detecting, off-road and mountain biking, off-road vehicles including ATVs, picnicking, dog walking, competitions or organized group events (e.g. cross country races), non-competitive organized events (e.g., weddings), operation of model boats and airplanes, swimming and sunbathing, waterskiing, personal watercraft (PWC), air thrust boats, soliciting of funds (per 50CFR 27.97 for Private Operations and per 50CFR 27.86 for Begging), and other activities identified in 50CFR Part 27.

- 11) All boaters would be required to operate their craft and possess all safety equipment in accordance with Delaware State and U.S. Coast Guard Regulations.
- 12) Beach access will occur only on refuge owned lands on the sandy part of the beach from the toe of the dunes to the Delaware Bay (mean high water demarcation to mean low water demarcation). One parking lot with a dune crossover provides access to the beach. Access on the dune and adjacent marshes is prohibited.

(e) Why is this use being proposed?

Wildlife observation, wildlife photography, environmental education, and interpretation are Priority Public Uses as defined by The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and if compatible, are to receive enhanced consideration over other general public uses.

These uses are conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wild lands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. These uses will provide opportunities for visitors to observe and learn about wildlife and wild lands at their own pace in an unstructured environment and to observe wildlife habitats firsthand. These uses will enhance the public's understanding of natural resource management programs and ecological concepts to enable the public to better understand the problems facing our wildlife/wild lands resources, to realize what effect the public has on wildlife resources, to learn about the U.S. Fish and Wildlife Service's (Service) role in conservation, to better understand the biological facts upon which Service management programs are based, and to foster an appreciation for the importance of wildlife and wild lands. It is anticipated that participation in these uses will result in a more informed public, with an enhanced stewardship ethic and enhanced support and advocacy for Service programs.

These uses will also provide wholesome, safe, outdoor recreation in a scenic setting, with the realization that those who come strictly for recreational enjoyment will be enticed to participate in the more educational facets of the public use program, and can then become informed advocates for the refuge and the Service.

AVAILABILITY OF RESOURCES:

Allowing the use of wildlife observation, photography, environmental education, and interpretation is within the resources available to administer our Visitor Services program with the current level of participation and to ensure that the use remains compatible with the refuge purposes. Additional funding for visitor services improvements can also come from challenge cost share projects, grant funds, and contributions. Compliance with refuge regulations is handled within the regular duties of the Station Law Enforcement Officer. As funding is available, the refuge will complete and maintain projects and facilities. Volunteers and partners will be utilized to help with construction and maintenance.

Facilities or materials needed to support this use include maintaining access roads, parking areas, gates, roadside pull-offs, kiosks, signs, the Visitor Contact Station, observation platforms, photography blinds, environmental education pavilion, wheelchair accessible fishing pier, boat launching areas, and hiking and canoeing trails; upgrading some of the existing boat launching areas; and providing information in refuge publications and the refuge's website.

In 2009, funds were allocated to upgrade refuge public use signage. Sufficient staff and maintenance funding within our base budget of nearly \$596,000 is available to make annual progress toward completion of all the projects described above and to maintain those already completed.

ANTICIPATED IMPACTS OF THE USE:

For a more complete analysis of the impacts of wildlife observation, photography, environmental education and interpretation, refer to chapter 5 of the CCP.

Wildlife observation and photography and environmental education and interpretation can result in positive or negative impacts to the wildlife resource. A positive effect of allowing visitor's access to the refuge will be the provision of additional wildlife-dependent recreational opportunities and a better appreciation and more complete understanding of the wildlife and habitats associated with Delmarva ecosystems.

Disturbance of refuge resources is the primary concern regarding commercially guided activities for wildlife observation. While field trip routes and observation sites are usually located in areas open to the general public, disturbance caused by large groups could be more intense because the number of people, and desire to get close to wildlife, may be greater than what normally occurs during general public activities. This disturbance will displace individual animals to adjacent areas of the refuge.

The refuge expects that wildlife observation, wildlife photography, environmental education, and environmental interpretation will have negligible short-term, long-term or cumulative impacts on the economy of the towns or county in which the refuge lies. We would not expect these activities to considerably alter the demographic of economic characteristics of the local community. No adverse impacts are foreseen to be associated with changes in the community character or demographic composition. In addition, impacts are expected to be negligible based on our observations of past visitor impacts from these uses.

Wildlife observation, wildlife photography, environmental education, and interpretation are expected to have negligible adverse short-term, long-term or cumulative impacts on soils, local or regional air quality, and hydrology or water quality. Environmental education activities that involve the sampling of wetlands and ponds could cause temporary, localized, minor impacts on water quality as the students disturb the bottom of the pond or walk on the marsh to gather specimens. Negative impacts to water quality can also result from human waste and litter.

Wildlife observation, wildlife photography, environmental education, and interpretation are expected to have negligible adverse short-term, long-term or cumulative impacts on vegetation. Negligible disturbance to vegetation will occur during the construction of new parking areas on Fowler Beach Road and on Broadkill Beach Road to facilitate wildlife observation/photography activities because existing interior roads and access routes will be used. Additionally, shoreline and bank activities such as hiking, wildlife viewing, photography, and environmental education programs can result in trampling of vegetation.

Disturbance factors resulting from public use are always considered for all listed species. Of these, impacts on the piping plover, American oystercatcher, common tern, Forster's tern, and least tern will be minimized through the seasonal closure of designated beach dunes and overwash areas from March 1 through September 1. A Section 7 Evaluation has been conducted as part of this review and it was determined that proposed activities would not likely affect the Delmarva fox squirrel. The bald eagle, a State-endangered species occurs on the refuge and areas near active bald eagle nests will not be open at anytime for wildlife observation, photography, environmental education, and interpretation and, therefore, are not expected to have any negative impacts on bald eagles (U.S. Fish and Wildlife Service 2007).

Wildlife observation, wildlife photography, environmental education, and interpretation are expected to have negligible adverse short-term, long-term or cumulative impacts on waterfowl. Providing waterfowl sanctuaries will minimize some of these impacts and allow waterfowl to have undisturbed access to these areas during biologically critical periods of the day. To minimize waterfowl disturbance from these uses, the refuge has designated approximately 3,000 acres as waterfowl sanctuaries that will be closed to hunting and other recreational use on a seasonal or annual basis.

This use is expected to have negligible adverse short-term, long-term or cumulative impacts on shorebirds and landbirds. We expect indirect impacts to landbirds to increase due to proposed expansions in public use activities including wildlife observation, wildlife photography, environmental education and interpretation. Disturbance to landbirds in proposed areas for wildlife observation, photography, and fishing is expected to be negligible since all visitors will be required to be on designated walking trails and access routes.

Wildlife observation, wildlife photography, environmental education, and interpretation are expected to have negligible adverse short-term, long-term or cumulative impacts on secretive marsh and waterbirds. We expect negligible impacts to secretive marsh and waterbirds due to proposed expansions in public use activities including wildlife observation, wildlife photography, and environmental education and interpretation. An increase in the number of hiking trails, particularly in or near wetland areas, has the potential to increase disturbance to secretive marsh and waterbirds.

Impacts to fisheries from visitors engaged in wildlife observation, photography, environmental education and interpretation are expected to be temporary and minor. Use of boats and canoes will cause increased suspension of bottom sediments, which should not adversely affect biological oxygen demand for fisheries resources. Boat motors may also harm submerged or emergent vegetation, which may cause a negligible negative impact to protective cover for fisheries.

Wildlife observation, wildlife photography, environmental education, and interpretation are expected to have negligible adverse short-term, long-term or cumulative impacts on mammals.

We also evaluated these uses for their potential to benefit or adversely affect amphibians and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Public outreach and education efforts by the refuge that emphasize buffering of wetlands, connectivity and easy access between forest, grassland, and wetlands, protection of vernal pools, and augmentation of patch size will benefit amphibians and reptiles on an even larger scale where embraced by other landowners. Additionally, impacts to invertebrates such as butterflies, moths, other insects, and spiders are expected to be negligible.

The beneficial impacts of providing the existing level of wildlife-dependent activities, with some modest increases, include helping meet existing and future demands for outdoor recreation and education, as documented in the State Comprehensive Outdoor Recreation Plan (DNREC 2003) and in the Visitor and Community Survey (Sexton et. al 2007). Visitor use is increasing over time as local residents and visitors become increasingly aware of refuge opportunities, and as we progress in creating new facilities and programs. The economic benefits of increased tourism likely would also benefit local communities.

Expanding opportunities for these uses is expected to have adverse impacts on a certain segment of the public that does not desire any change in public use programs and regulations, or that may hold differing views on the course of action. In addition, while new visitors become familiar with those changes, violations could increase. Some conflict between wildlife observers, photographers, students, and other refuge users is expected to result in short-term moderate adverse impacts, which will be managed through seasonal closures.

Guided tour activities may also conflict with other refuge users. For example, commercial or non-commercial tours will most likely use the same areas as independent wildlife viewers, kayakers and canoeists, and hunters and anglers during open seasons. Unregulated or inadequately regulated commercial guiding operations may adversely affect the safety of other refuge users, the quality of their experience, and the equity of opportunity.

Expanded facilities for environmental education and new or expanded visitor services programs are expected to increase public awareness of, and visitation to, the refuge, and would enable staff to provide better customer service. We would expect a certain level of inconvenience during the construction of refuge facilities. The adverse effects generally are short-term, and more than offset by the long-term gains in public education and appreciation. Impacts to refuge resources are expected to be negligible.

PUBLIC REVIEW AND COMMENT:

This compatibility determination is part of the refuge's Comprehensive Conservation Plan and Environmental Impact Statement. Public notification and review include a notice of availability published in the *Federal Register*; a 60-day comment period, and local media announcements.

DETERMINATION (CHECK ONE BELOW):

- Use is not compatible
- Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage these four priority public uses (wildlife observation, photography, environmental education, and interpretation) in accordance with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that these programs are providing safe, high quality experiences for participants. The refuge based these stipulations on our 1993 Public Use Plan; draft CCP and Environmental Impact Statement, and refuge-specific regulations (See Description of Use section).

To ensure compatibility with refuge purposes and the mission of the National Wildlife Refuge System, wildlife observation, photography, environmental education, and interpretation can occur on the refuge if the refuge-specific regulations are followed and following stipulations are met:

- 1) This use must be conducted in accordance with state and federal regulations (50CFR), and special refuge-specific regulations published in the Public Use Regulations brochure.
- 2) The public use program will be reviewed annually to ensure that it contributes to refuge objectives in managing quality recreational opportunities and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats. Refuge Law Enforcement Officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Refuge Law Enforcement personnel will monitor all areas and enforce all applicable State and Federal Regulations.
- 3) No refuge-specific permits are required.
- 4) All boats must be off the water at sunset.
- 5) Boat motor restrictions
 - a) 30 horsepower motor restriction on Prime Hook Creek and Slaughter Canal
 - b) Electric motors or manual propulsion only on Turkle & Fleetwood Ponds
 - c) Manual propulsion only on Goose & Flaxhole Ponds
 - d) Air thrust boats and jet skis are not permitted
 - e) A “Slow No Wake” zone of one-half mile has been established on the Headquarters Ditch
- 6) Areas may be closed on the refuge without prior warning.
- 7) Visitors must stay on the designated trail routes.
- 8) Except as noted below, the refuge is open for wildlife observation, wildlife photography, environmental education, and environmental interpretation in the following areas everyday from open one-half hour before sunrise to one-half hour after sunset. Some areas are seasonally restricted to minimize conflict among user groups and to minimize wildlife disturbance
 - a) Designated beach dunes and overwash areas: Closed from March 1 through September 1 due to nesting State endangered least terns and American oystercatchers, and the potential for use by federally endangered piping plovers. Areas may be reopened if no nesting activity occurs or when nesting ends for the season.

- b) Western Prime Hook Creek (from old shop ramp to Waples Pond): Closed every day during the deer and waterfowl hunting seasons, which typically starts on September 1 and ends in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - c) Deep Branch Road Trail (includes Goose & Flaxhole Ponds) and Eastern Prime Hook Creek (from old shop ramp to HQ ramp): Closed every day from September 1 through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - d) Headquarters Area (includes Turkle & Fleetwood Ponds): Closed only for a maximum of two days for deer hunts.
 - e) The northern portion of Unit IV (includes trail overlooking Vergie's Pond): Closed from the Monday before Thanksgiving through March 15. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - f) Hiking Trails on Fowler Beach Road, Prime Hook Road, and Slaughter Beach Road and Slaughter Canal: Closed except for Sundays from September 1 through the deer and waterfowl hunting seasons, which typically end in early February. Additional seasonal closures may apply through the second Saturday in May for hunting during the snow goose conservation order and/or turkey hunting.
 - g) Roadside pulloffs and water control structures/fishing areas at Petersfield Ditch, Slaughter Canal & Cods Road: Open year round.
- 9) Dog walking is not permitted on the refuge.
 - 10) Bicycling is allowed only on roads open to public vehicular traffic.
 - 11) The Visitor Contact Station is open weekdays from 7:30am to 4:00pm and seasonally on weekends.
 - 12) Groups of 15 or more pedestrian travelers and groups of six or more cyclists will require a Special Use Permit.
 - 13) The following activities are prohibited, including, but not limited to: ice skating, camping, roller blading, horseback riding, geocaching/metal detecting, off-road and mountain biking, off-road vehicles including ATVs, picnicking, dog walking, competitions or organized group events (e.g. cross country races), non-competitive organized events (e.g., weddings), operation of model boats and airplanes, swimming and sunbathing, waterskiing, personal watercraft (PWC), air thrust boats, soliciting of funds (per 50CFR 27.97 for Private Operations and per 50CFR 27.86 for Begging), and other activities identified in 50CFR Part 27.
 - 14) Beach access will occur only on refuge owned lands on the sandy part of the beach from the toe of the dunes to the Delaware Bay (mean high water demarcation to mean low water demarcation). One parking lot with a dune crossover provides access to the beach. Access on the dune and adjacent marshes is prohibited.
 - 15) Access to closed areas or use during the refuge's closed hours requires a special use permit, which is subject to the refuge manager's approval, unless the activity is in conjunction with a refuge staff- or volunteer-led program
 - 16) Changes outlined in the CCP dealing with closed and seasonally closed areas and public use regulations, when approved, will be incorporated into their respective public use program.

JUSTIFICATION:

Wildlife observation, photography, environmental education, and interpretation are priority wildlife-dependent uses for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and the National Wildlife Refuge System Administration Act of 1966, as amended by 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 ensure that they receive enhanced attention during planning and management.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated objectives. Available parking and size of the facilities will typically limit use at any given time, except during special events.

Conflicts between visitors are localized and are addressed through law enforcement, public education, and continuous review and updating to public use regulations. Conflicts are further reduced by the establishment of seasonal area closures.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the National Wildlife Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the Refuge.

This activity will not materially interfere with or detract from the mission of the Refuge System or the purpose for which the Refuge was established.

SIGNATURE:

Refuge Manager: _____
(Signature) (Date)

CONCURRENCE:

Regional Chief: _____
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE:

LITERATURE CITED:

See CCP Bibliography.