Appendix C

Tom Meredith/USFWS

Canoes on Magalloway River

Findings of Appropriateness and Compatibility Determinations

COMPATIBILITY DETERMINATION

USE: Wildlife observation, photography, environmental education and interpretation

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901 (b))
2. Migratory Bird Conservation Act (16 U.S.C. 715d)
3. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))
4. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

PURPOSE(S) FOR WHICH ESTABLISHED:

1. …the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions…16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986)

2. …for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. 715d (Migratory Bird Conservation Act)

3. …for the development, advancement, management, conservation, and protection of fish and wildlife resources… 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956)

4. …for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude… 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
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 uses are wildlife observation, photography, environmental education and interpretation. Wildlife observation, photography, environmental education and interpretation are priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?
Wildlife observation, photography, environmental education and interpretation will be allowed to occur on designated roads, trails, pull-outs, overlooks, and visitor contact facilities throughout the refuge. Excellent opportunities for wildlife observation and photography will also occur on the water. The refuge will provide a self guided river trail on the Magalloway River, and photography opportunities in waterfowl blinds. Remote camp sites will also provide and facilitate unique opportunities for wildlife observation. The exact location of where a particular activity, event, or workshop would be allowed to occur will be at the discretion of the Refuge Manager.

(c) When would the use be conducted?
Wildlife observation, photography, environmental education and interpretation will be allowed on the refuge daily, year-round, from half-hour before sunrise to half-hour after sunset, unless a conflict with a management activity or an extenuating circumstance necessitates deviating from these procedures. Closures for snow and ice storms or other events affecting human safety, or for nesting season and other sensitive times of the year are examples that would require these uses to be temporarily suspended.

(d) How would the use be conducted?
Wildlife observation, photography, environmental education and interpretation will be allowed to occur on the refuge. As an integral part of this program we will incorporate the strategies found in Goal 4, Alternative B (Proposed Action) of the Draft CCP/EA for Lake Umbagog National Wildlife Refuge.

Refuge staff will be responsible for on-site evaluations to resolve public use issues; monitor and evaluate impacts; maintain boundaries and signs; meet with adjacent landowners and interested public; recruit volunteers; prepare and present interpretive programs; expand existing trails and overlooks; revise leaflets and develop new ones; install kiosks and continually update kiosk information; 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 respond immediately to public inquiries.

(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 will be conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wildlands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. They 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/wildlands resources, to realize what effect the public has on wildlife resources, to learn about the Service's role in conservation, to better understand the biological facts upon which Service

management programs are based, and to foster an appreciation as to why wildlife and wildlands are important to them. The authorization of these uses will produce a more informed public, and advocates for Service programs. Likewise, these uses will provide opportunities for visitors to observe and learn about wildlife and wildlands at their own pace in an unstructured environment and to observe wildlife habitats firsthand.

Professional and amateur photographers will also be provided opportunities to photograph wildlife in their natural habitats. Photographic opportunities obviously will result in increased publicity 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 advocates for the refuge and the Service.

Availability of Resources:
Sufficient Refuge resources in terms of personnel and budget are available to administer wildlife observation, photography, environmental education and interpretations.

Cost Breakdown
The following is the list of costs to the refuge required to administer and manage the refuge programs for wildlife observation and photography and environmental education and interpretation.

Routine maintenance:	$4,000	annually. This is the expected cost to maintain the Refuge public use facilities including the maintenance of parking areas, removal of garbage, and restroom maintenance.
Install kiosks:	$3,000	one time expense.
Trail expansion:	$10,000	one time expense.
Supplies and materials:	$5,000	this includes signs, kiosks information, nesting site closure signs, interpretative and Refuge brochures.
Monitoring:	$2,000	annually. To be carried out in cooperation with the States.
Law Enforcement:	$3,000	annually for a Refuge Officer.
Total:	$27,000	($9,000 annually)

Anticipated Impacts of the Use:
Wildlife Observation and Photography, Environmental Education, and Interpretation can produce positive or negative impacts to the wildlife resource. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of the wildlife and habitats associated with northern New England ecosystems. This can translate into more widespread and stronger support for the Refuge, the National Wildlife Refuge System and the Service.

Direct Effects
Direct impacts are those where the activity has an immediate affect on wildlife. Anticipated direct impacts include disturbance to wildlife by human presence which typically results in a temporary displacement without long-term effects to individuals or populations. Some species will avoid areas frequented by people, such as developed trails and the buildings, while others seem unaffected or even drawn to human presence. Overall, effects should not be significant because the majority of the Refuge will experience minimal public use.

Indirect Effects
People can be vectors for invasive plants when seeds or other propagules are moved from one area to another. Once established, invasives can out compete native plants, thereby altering habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring, and when necessary, treatment. Staff will work to eradicate the invasives and educate the visiting public.

Cumulative Effects
Effects that are minor when considered alone, but collectively may be important are known as cumulative effects. The principal concerns are repeated disruptions of nesting, foraging, and/or resting birds.

Based on observations and knowledge of the areas involved, there is no evidence that cumulatively, the proposed wildlife-dependent uses will have an unacceptable effect on the wildlife resource. The landowners have allowed the public to engage in these wildlife-dependent uses for many years without discernable negative effects. Although a substantial increase in the cumulative impacts from public use is not expected in the near term, it will be important for Refuge staff to monitor use and respond, if necessary, to conserve the existing high quality wildlife resources.

The Refuge will close areas including campsites with active loon, bald eagle, and osprey nests to mitigate impact. Opening land to public use can often result in litter, vandalism, and other illegal activities on Refuge lands. Refuge staff will monitor and evaluate the effects of public use in collaboration with volunteers in an effort to discern and respond to unacceptable impacts to wildlife and habitats.

No additional effects from Wildlife Observation, Wildlife Photography, Environmental Education or Interpretation are anticipated. Therefore, allowing these uses on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. These uses fully benefit Goal 4 "Provide high quality wildlife dependent activities" and Goal 5 "Develop high quality interpretative opportunities, and facilitate environmental education, to promote an understanding and appreciation for the conservation of fish and wildlife and their habitats, as well as the role of the refuge in the Northern Forest" as described in the CCP. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:
As part of the CCP process for Lake Umbagog NWR this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EA. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

___ Use is Not Compatible

_X_ Use is Compatible with the following stipulations

Stipulations Necessary to Ensure Compatibility:
Public use areas will be monitored at various times of the year to assess wildlife disturbance. We would include information about proper etiquette and the effects of human impacts on habitat and wildlife resources in Refuge publications and flyers. Periodic law enforcement will ensure compliance with regulations and area closures, and would discourage vandalism.

To limit wildlife disturbance caused by human intrusion, we may limit access on some trails, coves and backwaters during the fall migration period to protect feeding and resting habitat for migratory birds. During nesting, we may offer only guided tours or we may close areas for certain periods of time. All other times of the year, the refuge would be open to visitors during normal Refuge hours.

We will ensure resource protection and visitor safety by providing full-time or seasonal law enforcement personnel to patrol areas and educate people about appropriate activities on Refuge lands.

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 these uses when compatible and consistent with sound fish and wildlife management and ensure that they receive enhanced attention during planning and management. Allowing wildlife observation, photography, environmental education and interpretation on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP. In fact, allowing these uses supports those goals and objectives and the Service's Mission.

Signature: Refuge Manager: Paul L Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D Léger 1-9-09
(Signature and Date)

Mandatory 15-year Reevaluation Date: January 9, 2024

COMPATIBILITY DETERMINATION

USE: Public hunting

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901 (b))

2. Migratory Bird Conservation Act (16 U.S.C. 715d)

3. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))

4. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

PURPOSE(S) FOR WHICH ESTABLISHED:

1. …the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions… 16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986)

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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?
Primary Use: The use is public hunting. Hunting is 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), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

Supporting Uses: Boating (motorized or non-motorized), camping

b. Where would the use be conducted?
Lake Umbagog National Wildlife Refuge has been open to public hunting of big game, upland game and migratory game birds, for all Service-owned lands within the Refuge boundary, since 2000 (U.S. Fish & Wildlife Service, Lake Umbagog National Wildlife Refuge Hunting Management Plan, 2000). This plan was amended through a separate NEPA process in 2007 (U.S. Fish and Wildlife Service, 2007a and U.S Fish and Wildlife Service, 2007b). Hunting occurs on all Refuge-owned land. Lands open to hunting include upland deciduous, coniferous, and mixed forests, as well as refuge wetlands and peatlands. These habitats support big game such as moose, deer, and black bear, as well as snowshoe hare, ruffed grouse, woodcock, and waterfowl, among others.

c. When would the use be conducted?
Hunting will be conducted during State (New Hampshire and Maine) big game, upland game, and waterfowl hunting seasons, and will be in accordance with Federal and State regulations. In cooperation with the States, hunt season dates and bag limits may be adjusted in the future as needed to achieve balanced wildlife population levels within carrying capacities.

d. How would the use be conducted?
The use will continue to be conducted according to State and Federal regulations. Federal regulations contained in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as existing Refuge-specific regulations will apply. No change from the existing hunt program is proposed. However, the Refuge Manager may, upon annual review of the hunting program, impose further restrictions on hunting activity, recommend that the Refuge be closed to hunting, or further liberalize hunting regulations within the limits of State law. Restrictions would occur if hunting becomes inconsistent with other higher priority Refuge programs or endangers Refuge resources or public safety.

Six permanent blinds are available to waterfowl hunters by reservation. Blinds are located in Leonard Pond, Sweat Meadows, and along nearby areas or backwaters of the Magalloway and Androscoggin Rivers. Waterfowl hunters will receive highest priority for blind reservations, during hunting season. Boat access for waterfowl and other types of hunting is available at a number of locations in the vicinity of Umbagog, both on and off refuge ownership. Waterfowl hunters will also be given preference for campsite reservations near blinds during hunting season, where possible. Hunting pressure appears to be moderate at the present time and visitor conflicts have not been significant. All areas of the refuge will therefore remain open to the public during hunting season. Should visitor conflicts increase significantly, then the refuge may have to consider zoning for different uses, or area closures.

Why is the use being proposed?
Hunting is one of the priority uses outlined by Congress in the Refuge Improvement Act of 1997. The Service supports and encourages priority uses on National Wildlife Refuge lands where appropriate and compatible. Hunting is used in some instances to manage wildlife populations. Hunting is also a

traditional form of wildlife-oriented recreation that can be accommodated on many National Wildlife Refuge System lands.

Availability of Resources:
Additional fiscal resources to conduct this activity would be minimal as the Refuge has been open to hunting since 2000 and since hunting will occur under State regulations and not as a Refuge regulated hunting program. Costs associated with administration of this use include:

Preparation of Annual Hunt Plan:	$500	GS-12 Deputy Refuge Manager/ GS-12 Wildlife Biologist
Preparation and Updating of Refuge Hunting Brochure:	$200	GS-12 Deputy Refuge Manager
Managing Waterfowl Blind Reservation System/ Dispensing Information during year:	$500	GS-6 Administrative Assistant
Law Enforcement/Outreach:	$3,000	GS-9 Refuge Officer
Maintenance of Waterfowl Blinds:	$500	WG7 Maintenance Worker
Total:	$4,700	

Anticipated Impacts of this use:
The following indented section is exerpted from the 2007 Amended Environmental Assessment on Public Hunting at Lake Umbagog National Wildlife Refuge (U.S. Fish and Wildlife Service, 2007a). For more specific impacts including a cumulative impacts analysis please refer to that document.

> Hunting pressure on the refuge is presently considered moderate for northern New Hampshire and western Maine. Allowing hunting would not displace most hunters who have traditionally hunted in this area. Refuge-specific regulations might impact some bear, coyote, hare, fisher, bobcat and raccoon hunters, inducing them to hunt outside the refuge. However, hunting pressure on these refuge species is generally low, so it is anticipated that approximately the same number of hunters who have traditionally used the area would use the refuge under this alternative. It is possible that a slight increase in hunter numbers could occur, due to the publicity and expectations associated with the designation and posting of the area as a national wildlife refuge open to hunting. It is not anticipated that this increase will be significant enough to warrant restrictions on the numbers of hunters permitted to use the area, or substantially increase traffic congestion in the area.
>
> Biological impacts would be minimal, since there would be no significant change from previous, long-standing hunting activities and use of the land.
>
> The physical effects of hunting on refuge vegetation should be limited, due to refuge-specific regulations restricting use of ATV's, off-road travel, permanent stands and blinds, camping, and fires. Indirect effects of hunting on vegetation might be neutral or positive, if habitat quality was maintained at its present or an improved level.

Given Federal regulations restricting hunting over bait, harvest of bear on the refuge would possibly decrease. Coyote and raccoon harvest would probably decrease, as a result of refuge-specific regulations which prohibit hunting at night.

Bobcat hunting will decrease on the Maine portion of the refuge, due to refuge-specific regulations which prohibit bobcat hunting. Bobcat are currently protected under New Hampshire hunting regulations, but can still be legally hunted and trapped in Maine. With respect to big game (moose and white-tailed deer) and other upland game species, hunters would not be displaced from the area and would be allowed to continue hunting as they have in the past, in accordance with State and Federal regulations.

There is no anticipated impact on endangered or threatened species on the refuge. Hunting of all legally hunted species has occurred on and around the refuge for many years with no known adverse impact on any listed species. The hunting program at Lake Umbagog NWR is not expected to have an adverse impact on lynx or gray wolves. Since neither lynx nor gray wolves have been documented on the refuge in recent times, it is highly unlikely that the hunting program will affect these species. In addition, any lynx that do occur on the refuge will be protected by refuge-specific regulations prohibiting bobcat hunting and night hunting.

Waterfowl species known to breed on the Refuge include: American black duck, ring-necked duck, wood duck, common goldeneye, hooded merganser, common merganser, mallard, blue-winged teal, and Canada goose. The Umbagog area supports high concentrations of American black ducks. Many additional species such as scoter, scaup, American wigeon, northern pintail, bufflehead, green-winged teal, and snow goose frequent the Refuge during migration. The primary waterfowl species taken by hunters are mallard, American black duck, green-winged teal, wood duck, and hooded merganser. In addition to waterfowl, major game species sought on the Refuge include: white-tailed deer, moose, snowshoe hare, and upland game birds, including ruffed grouse and woodcock. Since the refuge has been open to hunting since 2000 and hunting occurred in the Umbagog area for many years prior to the creation of the refuge, no additional impacts are anticipated. Some wildlife disturbance of non-target species and impacts to vegetation may occur. However, these impacts should be minimal since hunting pressure is moderate, occurs outside the breeding season, and Refuge-specific regulations prohibit the use of ATVs and permanent tree stands, which are most likely to significantly damage vegetation. Hunting also helps to keep populations of browsing species such as deer and moose within the carrying capacity of the habitat, thus reducing excessive damage to vegetation caused by over-browsing, and maintaining understory habitat for other species.

Currently, all areas of the Refuge are open to hunters and other members of the public during hunting season. Although conflicts between user groups can occur, this does not appear to be a significant issue at present use levels. In the future, the Refuge may need to manage public use to minimize conflicts and insure public safety, should significant conflicts become evident. This may include public outreach and using zoning to separate user groups.

Additional discussion of hunting impacts may be found in the Refuge's Final Environmental Assessment: Public Hunting (U.S. Fish and Wildlife Service, 2000a and 2007a). In summary, hunting on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. Hunting fully supports and benefits Goal 4 "Provide high quality wildlife dependent activities" of the CCP by providing opportunities for this wildlife-dependent use. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:
As part of the CCP process for Lake Umbagog NWR this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EA. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

_____ Use is Not Compatible

_X_ Use is Compatible With the Following Stipulations

Stipulations Necessary to Insure Compatibility:
The hunt program will be managed in accordance with Federal and State regulations. The program will be reviewed annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality hunting experience for participants. Stipulations are based on the refuge's Final Amended Environmental Assessment: Public Hunting (U.S. Fish and Wildlife Service, 2007a), and Hunting Management Plan (U.S. Fish and Wildlife Service, 2007b), and 2006-2007 Refuge-specific regulations submitted for publication in Title 50, Code of Federal Regulations (50CFR32.48 & 50CFR32.38) in 2006 and listed below:

New Hampshire

A. Hunting of Migratory Game Birds. We allow hunting of ducks, geese, snipe, coot, American crow, and woodcock in accordance with State of New Hampshire regulations, seasons, and bag limits subject to the following conditions:

1. Hunters must wear two articles of hunter-orange clothing or material. One article must be a solid-colored hunter orange hat; the other must cover a major portion of the torso, such as a jacket, vest, coat or poncho and must be a minimum of 50% hunter orange in color (ie. orange camouflage) except when hunting waterfowl.

2. We will provide permanent refuge blinds at various locations on the refuge that are available for public use by reservation. Hunters may make reservations for particular blinds up to 1 year in advance, for a maximum of 1 week, running Monday through Sunday during the hunting season. Hunters may make reservations for additional weeks up to 1 week in advance, on a space-available basis. We allow no other permanent blinds. Hunters must remove temporary blinds, boats, and decoys from the refuge following each day's hunt.

3. You may use trained dogs to assist in hunting and retrieval of harvested birds. Hunting with pointing, flushing and retrieving dogs on the refuge will be subject to the following regulations:

    i. We prohibit training during or outside of dog season.
    ii. We allow a maximum of two dogs per hunter.
    iii. Hunters must pick up all dogs the same day they release them.

4. We open the refuge to hunting during the hours stipulated under each State's hunting regulations but no longer than from ½ hour before legal sunrise to ½ hour after legal sunset. We close the refuge to night hunting. Hunters will unload all firearms outside of legal hunting hours.

5. We prohibit the use of all-terrain vehicles (ATVs or OHRVs) on refuge land.

B. Upland Game Hunting. We allow hunting of coyote, fox, raccoon, woodchuck, red and eastern gray squirrel, porcupine, skunk, snowshoe hare, ring-necked pheasant, northern bobwhite and ruffed grouse in accordance with State of New Hampshire regulations, seasons, and bag limits subject to the following conditions:

1. We prohibit night hunting.

2. You may possess only approved nontoxic shot when hunting with a shotgun.

3. We open the refuge to hunting during the hours stipulated under each State's hunting regulations, but no longer than from ½ hour before legal sunrise to ½ hour after legal sunset. We close the refuge to night hunting. Hunters must unload all firearms, and nock no arrows outside of legal hunting hours.

4. We prohibit the use of all-terrain vehicles (ATVs or OHRVs) on refuge land.

5. Each hunter must wear two articles of hunter-orange clothing or material. One article must be a solid-colored hunter orange hat; the other must cover a major portion of the torso, such as a jacket, vest, coat or poncho and must be a minimum of 50% hunter orange in color (ie. orange camouflage).

6. We allow hunting of snowshoe hare, ring-necked pheasant, ruffed grouse, and northern bobwhite with trained dogs during State hunting seasons. Hunting with pointing, flushing or trailing dogs on the refuge will be subject to the following regulations:

    i. We prohibit training during or outside of dog season.
    ii. We allow a maximum of two dogs per hunter.
    iii. Hunters must pick up all dogs the same day they release them.

C. Big Game Hunting. We allow hunting of bear, coyote, white-tailed deer, and moose in accordance with State of New Hampshire regulations, seasons, and bag limits. The following conditions also apply:

1. We open the refuge to hunting during the hours stipulated under each State's hunting regulations but no longer than from ½ hour before legal sunrise to ½ hour after legal sunset. We close the refuge to night hunting. Hunters will unload all firearms and nock no arrows outside of legal hunting hours.

2. We allow bear and coyote hunting with dogs during State hunting seasons. Hunting with trailing dogs on the refuge will be subject to the following regulations:

    i. Hunters must equip all dogs used to hunt bear and coyote with working radio-telemetry collars and hunters must be in possession of a working radio-telemetry receiver that can detect and track the frequencies of all collars used.
    ii. We prohibit training during or outside of dog season for bear and coyote.
    iii. We allow a maximum of four dogs per hunter.
    iv. Hunters must pick up all dogs the same day they release them.

3. We allow pre-hunt scouting of the refuge; however, we prohibit dogs and firearms during pre-hunt scouting.

4. Each hunter must wear two articles of hunter-orange clothing or material. One article must be a solid-colored hunter orange hat; the other must cover a major portion of the torso, such as a jacket, vest, coat or poncho and must be a minimum of 50% hunter orange in color (ie. orange camouflage).

5. We prohibit the use of all-terrain vehicles (ATVs or OHRVs) on refuge land.

6. We allow temporary tree stands and blinds, but hunters must remove them by the end of the season. We prohibit nails, screws, or screw-in climbing pegs to build or access a stand or blind.

Maine

A. Hunting of Migratory Game Birds. We allow hunting of ducks, geese, snipe, coot, rails, American crow, and woodcock in accordance with State of Maine regulations, seasons, and bag limits subject to the following conditions:

1. Hunters must wear two articles of hunter-orange clothing or material. One article must be a solid-colored hunter orange hat; the other must cover a major portion of the torso, such as a jacket, vest, coat or poncho and must be a minimum of 50% hunter orange in color (ie. orange camouflage) except when hunting waterfowl.

2. We will provide permanent refuge blinds at various locations on the refuge that are available for public use by reservation. Hunters may make reservations for particular blinds up to 1 year in advance, for a maximum of 1 week, running Monday through Sunday during the hunting season. Hunters may make reservations for additional weeks up to 1 week in advance, on a space-available basis. We allow no other permanent blinds. Hunters must remove temporary blinds, boats, and decoys from the refuge following each day's hunt.

3. You may use trained dogs to assist in hunting and retrieval of harvested birds. Hunting with pointing, flushing and retrieving dogs on the refuge will be subject to the following regulations:

    i. We prohibit training during or outside of dog season.
    ii. We allow a maximum of two dogs per hunter.
    iii. Hunters must pick up all dogs the same day they release them.

4. We open the refuge to hunting during the hours stipulated under each State's hunting regulations but no longer than from ½ hour before legal sunrise to ½ hour after legal sunset. We close the refuge to night hunting. Hunters will unload all firearms outside of legal hunting hours.

5. We prohibit the use of all-terrain vehicles (ATVs or OHRVs) on refuge land.

B. Upland Game Hunting. We allow hunting of fox, raccoon, woodchuck, red and eastern gray squirrel, porcupine, skunk, snowshoe hare, ring-necked pheasant, ruffed grouse and northern bobwhite in accordance with State of Maine regulations, seasons, and bag limits subject to the following conditions:

1. We prohibit night hunting.

2. You may possess only approved nontoxic shot when hunting with a shotgun.

3. We open the refuge to hunting during the hours stipulated under each State's hunting regulations, but no longer than from ½ hour before legal sunrise to ½ hour after legal sunset. We close the refuge to night hunting. Hunters must unload all firearms, and nock no arrows outside of legal hunting hours.

4. We prohibit the use of all-terrain vehicles (ATVs or OHRVs) on refuge land.

5. Each hunter must wear two articles of hunter-orange clothing or material in accordance with Maine law. One article must be a solid-colored hunter orange hat; the other must cover a major portion of the torso, such as a jacket, vest, coat or poncho and must be a minimum of 50% hunter orange in color (ie. orange camouflage).

6. We allow hunting of snowshoe hare, ring-necked pheasant, ruffed grouse, and northern bobwhite with trained dogs during State hunting seasons. Hunting with pointing, flushing or trailing dogs on the refuge will be subject to the following regulations:

    i. We prohibit training during or outside of dog season.
    ii. We allow a maximum of two dogs per hunter.
    iii. Hunters must pick up all dogs the same day they release them.

C. Big Game Hunting. We allow hunting of bear, white-tailed deer, coyote and moose in accordance with State of Maine regulations, seasons, and bag limits. The following conditions also apply:

1. We open the refuge to hunting during the hours stipulated under each State's hunting regulations but no longer than from ½ hour before legal sunrise to ½ hour after legal sunset. We close the refuge to night hunting. Hunters will unload all firearms and nock no arrows outside of legal hunting hours.

2. We allow bear and coyote hunting with dogs during State hunting seasons. Hunting with trailing dogs on the refuge will be subject to the following regulations:

    i. Hunters must equip all dogs used to hunt bear or coyote with working radio-telemetry collars and hunters must be in possession of a working radio-telemetry receiver that can detect and track the frequencies of all collars used.
    ii. We prohibit training during or outside of dog season for bear or coyote.
    iii. We allow a maximum of four dogs per hunter.
    iv. Hunters must pick up all dogs the same day they release them.

3. We allow prehunt scouting of the refuge; however, we prohibit dogs and firearms during prehunt scouting.

4. Each hunter must wear two articles of hunter-orange clothing or material. One article must be a solid-colored hunter orange hat; the other must cover a major portion of the torso, such as a jacket, vest, coat or poncho and must be a minimum of 50% hunter orange in color (ie. orange camouflage).

5. We prohibit the use of all-terrain vehicles (ATVs or OHRVs) on refuge land.

6. We allow temporary tree stands and blinds, but hunters must remove them by the end of the season. We prohibit nails, screws, or screw-in climbing pegs to build or access a stand or blind.

Justification:
Hunting is a wildlife-dependent priority public use with minimal impact on refuge resources. It is consistent with the purposes for which the Refuge was established, the Service policy on hunting, the National Wildlife Refuge system Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

Hunting on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul F Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Leger 1-9-09
(Signature and Date)

Mandatory 15-year Re-evaluation Date: January 9, 2024

References

U.S. Fish and Wildlife Service. 1997. National Wildlife Refuge Improvement Act 1997. Public Law 105-57-Oct. 9, 1997.

U.S. Fish and Wildlife Service. 2000a. Final environmental assessment: public hunting at Lake Umbagog National Wildlife Refuge, Coos Co., NH, Oxford Co., ME. U.S. Fish and Wildlife Service, Lake Umbagog National Wildlife Refuge, Errol, NH.

U.S. Fish and Wildlife Service. 2000b. Hunting management plan: Lake Umbagog National Wildlife Refuge. U.S. Fish and Wildlife Service, Lake Umbagog National Wildlife Refuge, Errol, NH.

U.S. Fish and Wildlife Service. 2007a. Final Amended Environmental Assessment: Public Hunting. Lake Umbagog National Wildlife Refuge, Errol, NH.

U.S. Fish and Wildlife Service. 2007b. Hunting Management Plan. Lake Umbagog National Wildlife Refuge, Errol, NH.

COMPATIBILITY DETERMINATION

USE: Public fishing

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITIES:

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C. 3901 (b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4)]
4. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(b)(1)]

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions." 16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986)

2. "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…" 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956)

4. "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
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 public fishing, 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 (Public Law 105-57).

(b) Where would the use be conducted?
The use would be conducted at all Refuge bodies of water that are open to fishing including lakes, ponds, streams, and rivers.

(c) When would the use be conducted?
The use would be conducted during the hours and in the seasons specified in the fishing regulations of the States of New Hampshire and Maine.

(d) How would the use be conducted?
The use would be conducted under New Hampshire and Maine state fishing regulations for open water and ice-fishing, with some additional restrictions to protect fish, wildlife, and habitat, and to reduce potential public use conflicts. This compatibility determination applies primarily to shoreline fishing and fishing access from refuge lands. The open waters of great ponds (ponds > 10 ac.), Umbagog Lake, and associated major rivers, fall under state regulation, and for the most part, are accessible from State boat launches.

Boat access for fishing and other activities is available at a number of locations both on and off refuge ownership near Umbagog Lake (see Map C-1). Two State of New Hampshire public boat launches provide boat-trailer access to the upper Androscoggin River, Magalloway River, mouth of the Rapid River, and Umbagog Lake. One launch is located upstream of the Errol Dam, and the other is at the southern end of Umbagog Lake. We provide additional boat-trailer access is also provided on Refuge-owned land at the Steamer Diamond landing on the Androscoggin River and at Refuge headquarters on the Magalloway River. A car-top boat launch is located at Parson's landing on the Magalloway River, just south of the refuge headquarters.

The public occasionally fishes and launches canoes at other sites along Route 16, where it crosses or approaches the Magalloway and Androscoggin rivers. At some of those sites, inadequate parking or poor visibility for oncoming traffic present safety hazards. The Refuge is constructing an additional car-top boat launch in Wentworth Location on the Magalloway River, north of Refuge headquarters. The new site will provide parking, a dock, and restroom. After completing that new site, we will close all other boat access points along Route 16, excluding the access at the refuge headquarters and the Steamer Diamond Landing (see Map C-1).

We are also planning to improve and maintain the trail to Mountain Pond from the Mt. Pond Road, widening it enough to be ADA-compliant, if possible, and surfacing it with native materials and wood chips. Pedestrians will be able to use that 0.1 mile-long spur trail to access fishing at Mountain Pond, most readily by the Mt. Pond Trail, from a parking area 0.49 miles to the north. Neither the Mt. Pond Rd. Trail nor the Mt. Pond spur trail will be open to motorized vehicles outside of the snowmobile season. We will provide an 8 ft x 16 ft floating ADA-accessible fishing dock on the west shore of the pond. Fishing will not be permitted from any other locations along the Mt. Pond shoreline.

Fishing will be permitted according to state regulations at Mountain Pond and from the shore of Whaleback Ponds, Brown Owl Pond, the Swift and Dead Cambridge Rivers, and refuge streams. None of those has developed boat launches, and we are not proposing to add boat launches to any of them. Access will be by foot only. However, fishing from boats will be permitted at these locations, where practical.

Fishing from shore near residential areas will not be permitted, to minimize conflicts with adjacent private landowners and lessees. In addition, fishing from shore on islands will not be permitted, with the exception of state-run campsites. Due to the sensitive nature of island shoreline habitat and the

fact that a boat is necessary to access islands, the need to get out of a boat and fish from the shoreline of an island would not outweigh the habitat impact concerns. Fishing derbies and tournaments from refuge lands would be considered on a case-by-case basis under a special use permit.

Motorized boats may be launched from the Steamer Diamond Landing on the Androscoggin River and the refuge headquarters on the Magalloway River. All boats launching or landing on refuge lands must follow state boating regulations and be registered, if applicable, with the appropriate state.

The public must inspect motor boats and trailers and clean them of aquatic invasive species before launching at refuge sites. That cleaning should take place on dry ground well away from the water. Exotic, nuisance plants or animals on boats, trailers, diving equipment, or in bait buckets can disrupt aquatic ecosystems and negatively impact native fish and plant species. Umbagog Lake and its associated rivers appear to be relatively free of aquatic invasive plants, and cleaning of boats, trailers, and other equipment will help keep them that way. Signs, education, and periodic enforcement will remind the public of these regulations.

Unauthorized introductions of both non-native and native fish can also significantly disrupt aquatic ecosystems and destroy natural fisheries. No fish of any species may be introduced onto the refuge without appropriate state and refuge permits. This includes unused bait fish and eggs.

Loons, waterfowl, and other water birds may die of lead poisoning from swallowing lead fishing tackle. Many ducks and other water birds find food at the bottom of lakes. Most of these birds also swallow small stones and grit to aid in grinding their food. Some of the grit may contain lead from angling equipment. They may also ingest lead and other fishing tackle by consuming bait fish or escaped fish that still have fishing tackle attached. An investigation into causes of mortality in loons in New England found 52 percent of loon carcasses submitted to Tufts University Wildlife Clinic had died of lead poisoning from ingestion of lead sinkers (Pokras and Chafel. 1992). Although other studies have reported lower percentages, lead toxicity clearly poses a significant threat to wildlife. During the past few years, three loon carcasses have been recovered from Umbagog Lake that showed signs of poisoning from lead sinkers. Because of that threat, no lead fishing sinkers or jigs will be permitted on the refuge. Discarded tackle and line also pose a threat to fish-eating birds, including eagles, osprey, and loons.

At the discretion of the refuge manager, some areas may be seasonally, temporarily, or permanently closed to fishing, if wildlife or habitat impacts or user conflicts become an issue. In cooperation with state fisheries biologists, we may manipulate the fisheries and/ or habitat to promote or improve the fishery resource, if warranted. That may include changing fishing regulations (season dates, creel limits, methods of take), adjusting water levels (in cooperation with FPLE), introducing or removing fish barriers, manipulating instream or streambank habitat, designating riparian buffers, limiting timber harvest in the vicinity of streams, lakes, or ponds, etc.

(e) Why is the use being proposed?

The use is being proposed by the Refuge to accommodate one of the priority public uses of the Refuge System. We have the opportunity to provide public fishing opportunities in a manner and location that will offer high quality, wildlife-dependent recreation and maintain the level of current fish and wildlife values.

Availability of Resources:
Facilities or materials needed to support fishing include a new car-top boat launch off Route 16, north of the Refuge office. This launch has been paid for out of FY 2005 funds and no additional construction expenses. Existing launch sites that have been scheduled for closure may require the installation of closure signs, as well as some site restoration work. Additional resources and staff time will be required to maintain the new boat launch, put down gravel and maintain the Steamer Diamond launch, close off wildlife nesting sites to the public, provide interpretative materials and brochures on fishing, and monitor the fishery, public use, and impacts of fishing. A refuge officer and the States of New Hampshire and Maine will provide law enforcement.

We do not anticipate charging fees for fishing. We estimate these costs associated with this use.

Routine maintenance:	$7,000	annually.This is the expected cost to maintain the three public boat launches (Magalloway River, refuge office, and Steamer Diamond landing) and includes putting down gravel; maintenance of parking areas, removal of garbage, and restroom maintenance at the Magalloway River launch.
Supplies and materials:	$6,000.	This includes signage for closed launch sites, buoys and nesting site closure signs, interpretative brochures, fishing regulations brochures (produced in house)
Monitoring:	$3,000	annually, to be carried out in cooperation with the States.
Law Enforcement:	$3,000	annually for a Refuge Officer.
Total:	$19,000	

Anticipated Impacts of the Use:
Although New Hampshire Fish and Game, Maine Department of Inland Fisheries and Wildlife, and the Service have carried out several limited surveys of Umbagog Lake, the Magalloway River, Rapid and Dead Cambridge rivers and C Pond, no comprehensive, refuge area-wide fishery or angler surveys have been carried out to date. The limited documentation available confirms more than 20 species of fish present in water bodies near the refuge. The species in table 1, below, have been reported from Umbagog Lake and associated rivers (Magalloway, Androscoggin, Rapid, Dead and Swift Cambridge Rivers):

Table 1. Fish species reported

Umbagog Lake and Androscoggin River	
Native species	**Introduced species**
Brook trout	Landlocked salmon
Brown bullhead (hornpout) (possibly introduced?)	Brown trout (confirmed in upper lakes, but not Umbagog)
Creek chub	Lake trout
Lake chub	Splake

Umbagog Lake and Androscoggin River cont.	
Native species	**Introduced species**
Fallfish	Rainbow trout (below Errol Dam only)
Pearl dace	Rainbow smelt
Finescale dace	Landlocked alewife
Northern redbelly dace	Yellow perch
Common shiner	Smallmouth bass
Golden shiner	Largemouth bass
Fathead minnow	Chain pickerel
Longnose sucker	Northern pike (probably extirpated)
White sucker	Lake whitefish (introduced early 1900's by Maine Fish Comm. in Mooselookmeguntic Lake and collected in Umbagog, but now extirpated)
Pumpkinseed sunfish	
Slimy sculpin	
American eel (confirmed in C Pond, but not Umbagog)	

C Pond	
Native species	**Introduced species**
Brook trout	Rainbow smelt
Brown bullhead (hornpout) (possibly introduced?)	Smallmouth bass
Blacknose shiner	
Creek chub	
Lake chub	
Fallfish	
Common shiner	
Golden shiner	
Fathead minnow	
White sucker	
Pumpkinseed sunfish	
Slimy sculpin	
American eel	

Pond in the River	
Native species	**Introduced species**
Brook trout	Landlocked salmon
Brown bullhead (hornpout) (possibly introduced?)	Brown trout (confirmed in upper lakes, but not PIR)
Creek chub	Lake trout
Lake chub	Rainbow smelt
Fallfish	Landlocked alewife
Blacknose dace	Yellow perch
Pearl dace	Smallmouth bass
Finescale dace	Chain pickerel
Northern redbelly dace	
Common shiner	
Golden shiner	
Fathead minnow	
White sucker	
Longnose sucker	
Pumpkinseed sunfish	
Slimy sculpin	
American eel (confirmed in C Pond, but not PIR)	

Magalloway River (below Aziscohos Dam)	
Native species	**Introduced species**
Brook trout	Landlocked salmon
Brown bullhead (hornpout) (possibly introduced?)	Brown trout (confirmed in upper lakes, but not Magalloway R)
Lake chub	Splake
Golden shiner	Rainbow smelt
White sucker	Yellow perch
Slimy sculpin	Smallmouth bass
American eel (confirmed in C Pond, but not Magalloway R)	Chain pickerel

Rapid River	
Native species	**Introduced species**
Brook trout	Landlocked salmon
Creek chub	Brown trout (confirmed in upper lakes, but not Rapid R)
Lake chub	Rainbow smelt
Fallfish	Yellow perch
Blacknose dace	Smallmouth bass
Northern redbelly dace	
Longnose dace	
Common shiner	
Golden shiner (possibly introduced?)	
White sucker	
Slimy sculpin	
American eel (confirmed in C Pond, but not Rapid River)	
Dead Cambridge River	
Native species	**Introduced species**
Brook trout	Smallmouth bass
Brown bullhead (hornpout) (possibly introduced?)	Yellow perch also likely present in lower reaches
Creek chub	
Fallfish	
Blacknose dace	
Longnose dace	
Common shiner	
White sucker	
American eel (confirmed in C Pond, but not Dead Cambridge)	

The changes in both the abundance and species composition of the Umbagog Lake fishery during the past 150 years have created a fishery today that bears very little resemblance to that which was present prior to the establishment of the first Errol Dam in 1853. During the 1800s, the lake supported a thriving brook trout population.

Prior to 1900, introductions of Atlantic salmon, chain pickerel, rainbow smelt, yellow perch, and several other species occurred in the Androscoggin River and/or in the Rangeley Lakes. Changes that are more recent include the introduction in the mid-1980s and subsequent population expansion of smallmouth bass in the lake. Northern pike have also been observed in the lake in recent years, but their present population status remains unclear (Bonney, 2002).

Umbagog Lake is primarily a warm-water fishery, with an average depth of 12 ft. A 'deep hole' located in the northeast section of the lake, near Sunday Cove, and extending to a depth of approximately 50 ft., supports a limited cold water salmonid fishery (landlocked salmon, brook trout). As an interstate body of water, the lake is governed by special state fishing regulations. A licensed New Hampshire or Maine angler may fish any part of the lake, which includes the waters of the Androscoggin River upstream of the Errol Dam, the waters of the Magalloway River within the State of New Hampshire and the waters of the Rapid River upstream to the marker at Cedar Stump in the State of Maine.

C Pond, the Rapid River, and parts of the Dead Cambridge River support wild brook trout fisheries. Wild brook trout also occur upstream of the refuge on the Magalloway and Diamond Rivers. The smallmouth bass originally introduced into Umbagog Lake have been expanding into all those water bodies, including C Pond and Pond in the River.

Bass may compete with and negatively impact brook trout and landlocked salmon fisheries. The Maine Department of Inland Fisheries and Wildlife has created a fish barrier on the Dead Cambridge River to prevent smallmouth bass expansion from impacting the C Pond brook trout fishery. Maine is also concerned about continued expansion of smallmouth bass from Umbagog into the Rapid River and Rangeley Lakes systems. Both Maine and New Hampshire are currently cooperating on brook trout and bass radio-telemetry studies on the Magalloway, Diamond, and Rapid Rivers, in order to gain a better understanding of movements, behavior, and interactions between these species. The Rapid River is of particular concern because of its high quality brook trout and salmon fishery and increasing popularity with anglers. Boucher (1995) reported over 31,000 angler-hours (8,000 fishing trips) of use on the Rapid River in 1995. Smallmouth bass fishing in Umbagog Lake has increased tremendously over the past few years, with the explosion of the bass population

Umbagog Lake and associated rivers are subject to atmospheric mercury deposition, which can cause mercury contamination of fish, and toxicity to wildlife that feed on them, such as loons and bald eagles. New Hampshire and Maine have both issued statewide health advisories about human consumption of freshwater fish with mercury contamination. Of particular concern is the consumption of warm water species, since they tend to have higher levels of mercury in their tissue.

Because Umbagog Lake and its rivers are accessible to fishing from the two New Hampshire state boat launches, we do not expect opening the rest of the refuge for fishing to result in a dramatic change from existing conditions.

Potential impacts of fishing follow:

- **Accidental or deliberate introductions of non-native fish** that may negatively impact native fish, wildlife, or vegetation: Illegal fish introductions have a long history in the Umbagog area. The refuge will continue to work with both states in providing educational outreach and signs on that subject and trying to contain introductions once they occur. Adding a refuge law enforcement officer will supplement state enforcement.

- **Accidental introduction of invasive plants, pathogens, or exotic invertebrates**, attached to fishing boats: With the exception of a few isolated occurrences of purple loosestrife, refuge waters appear to be relatively free of invasive aquatic plants and mollusks. However, we have not carried out extensive surveys of aquatic invasive plants. We can mitigate their impacts by continuing education, outreach, and initiating an intensive water monitoring program.

- **Negative effects on loons, eagles, osprey, waterfowl, and other wildlife from lost fishing gear** (i.e. from ingesting lead sinkers, hooks, lures, litter, or becoming entangled in fishing line or hooks): Lost fishing tackle may harm loons, waterfowl, eagles, and other birds externally by catching and tearing skin. Fishing line may also become wrapped around body parts and hinder movement (legs, wings), impair feeding (bill), or cause a constriction with subsequent reduction of blood flow and tissue damage. An object above or below the water surface may snag entangled animals, from which they are unable to escape. Nineteen percent of loon mortalities in Minnesota were attributed to entanglement in fishing line (Ensor et al. 1992). Entanglement in fishing line has also caused mortality in bald eagles.

  Birds may also ingest sinkers, hooks, floats, lures, and fishing line. Ingested tackle may cause damage or penetration of the mouth or other parts of the digestive tract, resulting in impaired function or death. Lead tackle is particularly toxic to wildlife. An investigation into causes of mortality in loons in New England found 52 percent of loon carcasses submitted to Tufts University Wildlife Clinic had died of lead poisoning from ingestion of lead sinkers (Pokras and Chafel. 1992). Three Umbagog loon carcasses recovered and analyzed in the past few years showed signs of lead poisoning from lead sinkers or had ingested fishing hardware. Fishing hardware and line have also been found in and around osprey and bald eagle nests both on and off Refuge.

  Maine prohibits the sale of lead sinkers, and in 2006, New Hampshire prohibited both the sale and use of lead sinkers of a certain size. The refuge will continue to provide education and outreach on the hazards of lead sinkers and discarded fishing tackle. The refuge officer will help in that public outreach.

- **Disturbance of wildlife** (particularly breeding and brood-rearing loons, waterfowl, eagles, osprey, wading birds): Fishing seasons in Maine and New Hampshire coincide in part with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Anglers and other boaters may disturb nesting birds by approaching too closely to nests, causing nesting birds to flush. Flushing may expose eggs to predation or cooling, resulting

in egg mortality. Both adult and flightless young birds may be injured or killed when run over by speeding boats. We will continue to close refuge areas seasonally to fishing, boating, and camping around sensitive nest sites, in conjunction with the states of Maine and New Hampshire. We will also continue our public outreach and the placement of warning signs. We monitor public use to help improve our management of public use, fisheries, and wildlife.

- **Reduction or alteration of prey base** important to fish-eating wildlife: Introductions of fish species over the years have undoubtedly altered the community composition of Umbagog Lake and associated rivers. Whether this has positively or negatively impacted fish-eating wildlife is unknown at this time.

- **Negative impacts on water quality** from motorboat and other pollutants, human waste, and litter: Extensive water quality testing on the Umbagog system has not been carried out. The levels of pollutants from boat fuel and impacts on local aquatic systems are unknown. Hydrocarbon contamination can be harmful to fish. We will initiate public outreach and education on littering, pollutants, proper waste disposal, and the advantages of 4-stroke engines, will be initiated to help mitigate water quality impacts. Water quality testing will be carried out as funding levels permit.

- **Bank and trail erosion** from human activity (boat landings, boat wakes, foot traffic, camping), which may increase aquatic sediment loads of streams and rivers, or alter riparian or lakeshore habitat/ vegetation in ways harmful to fish or other wildlife: Boat access will be restricted to designated areas only. Those areas will be 'hardened' to contain impacts to a small area. We will monitor the campsites and launch sites, and may modify, restore or close them if conditions warrant. Wetlands guard much of the refuge shoreline, making it extremely difficulty to access for shore-based fishing. We do not intend to construct any new trails or boardwalks to provide shore-based fishing access, with the exception of the Mt. Pond area. All new trail and access construction will follow best management practices. Therefore, at current levels of use, we do not expect trail erosion to increase because of foot traffic related to fishing.

- **Negative impacts from fishing boats and foot traffic to sensitive wetlands** or peatlands and rare wetland plants. Boat access sites and trails will be located away from sensitive wetlands, peatlands, and rare plants. Habitat features, important to trout such as over-hanging banks, will be protected from disturbance.

- **Illegal fishing** resulting in over-harvest. By adding a refuge officer, the refuge will be able to supplement state enforcement to help reduce this type of activity.

- **Vegetation disturbance associated with installation of new boat launch and fishing access sites:** Although the new boat launch will be located within the floodplain of the Magalloway River, ground disturbance will be minimal. Because fishing will occur from non-motorized watercraft or a dock, no erosion is expected from bank fishing or trampling of vegetation. A trail already runs to Mt. Pond from Mt. Pond Rd., and improvements to that trail and its access site should not result in additional impacts on vegetation.

- **Conflicts between anglers and other user groups:** We know that some conflicts among motorized and non-motorized users have arisen on the refuge in the past. In addition, local cabin owners have expressed concerns about trespass and inappropriate human waste disposal by boaters, primarily canoeists and kayakers. The comfort station under construction at the Magalloway River launch site should help to reduce some of these conflicts. We intend to carry out public use surveys in 2006 that will help identify additional conflicts between user groups. Should any significant conflicts become evident, we may need to manage public use on the refuge to minimize conflicts. That may include providing additional education and outreach, providing additional sanitary facilities, or creating zones to separate groups of users.

Public fishing on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1 and 2 ("Manage open water and wetlands," and "Manage floodplain and lakeshore habitats") as written in the CCP. Monitoring will identify any actions needed to respond to new information and correct problems that may arise in the future. Public fishing benefits Goal 4 "Provide high quality wildlife dependent activities" of the CCP by providing for one of the listed uses. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment

As part of the comprehensive planning process for the Lake Umbagog refuge, this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

_____ Use is Not Compatible

___X___ Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- We will review the fishing program annually to ensure that it contributes to refuge objectives in managing a quality fishery and protecting habitats. This may include surveys of angler, fish, and habitat.

- We will prohibit lead sinkers and other lead tackle to prevent ingestion by wildlife and possible lead poisoning.

- We will permit boat launching only in designated areas to prevent erosion and degradation of wetlands or water quality and ensure public safety.

- We will not permit fishing from near residential areas, to minimize conflicts with adjacent private landowners and lessees. In addition, we will not permit fishing from shore on the islands, with the exception of state-run campsites. On much of the Refuge, demand for shore-based fishing is relatively low, and we do not believed it significantly affects refuge resources. We will be monitor its impacts and, if warranted, will take action to mitigate them, including seasonal or permanent closures.

- We will close wildlife nesting and brood-rearing areas seasonally to all public use, to prevent the disturbance of wildlife. This may include temporarily closing or relocating remote campsites or temporarily closing access sites.

- Access trails and launches will be constructed and situated in a way to provide for public safety and minimize disturbance of wildlife and habitat or the effects of siltation. We will use vegetation and other means of stabilizing soils around any culverts at road crossings. Protecting canopy trees from damage by humans or beavers will keep stream habitat shaded. We will monitor impacts and close, modify, restore, or even move an access if there problems arise.

- We will cooperate with the fishery resource agencies of the states in implementing angling regulations and management actions.

- We will increase public outreach and education to minimize conflicts between user groups, help control aquatic invasive plants and lead in the environment, reduce the introduction of non-native fish, and minimize the disturbance of wildlife and habitat.

- A refuge officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.

Justification: Fishing is one of the six priority public uses of the National Wildlife Refuge System and has been determined to be a compatible activity on many refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate these six uses. Public fishing on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul J Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
(Signature and Date)

Mandatory 15-year Re-evaluation Date: January 9, 2024

Literature Cited:

Bonney, F. 2002. Personal communication. Maine Inland Fisheries and Wildlife.

Boucher, D. P.. 1995. Rapid River salmonid management. Fishery Interim Summary Report Ser. No. 95-6. Maine Dept. of Inland Fisheries & Wildlife, Augusta, ME.

Ensor, K.L., D.D. Helwig, and L.C. Wemmer. 1992. The common loon in Minnesota: potential contaminant implications *in* L. Morse, S. Stockwell and M. Pokras, eds. Proc. from the 1992 conference on the loon and its ecosystem: status, management, and environmental concerns, Bar Harbor, ME.

Pokras , M.A. and R. Chafel. 1992. Lead toxicosis from ingested fishing sinkers in adult common loons (*Gavia immer*) in New England. J. of Zoo and Wildl. Med. 23(1):92-97.

Attachments: Map C-1, showing existing and planned boat access points.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog 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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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** X

Refuge Manager: Paul L Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Commercial forest management

Narrative

The primary objective of forest management will be to enhance and maintain habitat for our focal management species and associated communities over the long-term. Upland forest habitat on the refuge now lacks the optimal structure, composition, and patch size those species require. Forest management can improve and accelerate the development of appropriate structures and forest composition. Without active management, the development of appropriate habitat may take longer or fail to happen at all, depending on site characteristics, prior management history, and the frequency of natural disturbances. Forest management can also create and maintain the appropriate forest structure and age or size class distribution on the landscape into the future, so that adequate habitat is always available for species of concern. Because the refuge lacks the funding, personnel, or equipment to carry out forest management safely, commercial timber harvest and silvicultural treatments are the only reasonable alternative for accomplishing the work. Commercial timber harvest is an economic activity on the refuge and is regulated under 603 FW 2.6 (N) requiring both an Appropriateness Determination and a Compatibility Determination.

COMPATIBILITY DETERMINATION

USE: Commercial forest management

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITIES

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C. 3901(b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4)]
4. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(b)(1)]

PURPOSES FOR WHICH ESTABLISHED

1. "for the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions…"[16 U.S.C. 3901(b); Emergency Wetlands Resources Act of 1986]

2. "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds…." [16 U.S.C. 715d; Migratory Bird Conservation Act]

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…" [16 U.S.C. 742f(a)(4); Fish and Wildlife Act of 1956]

4 "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" [16 U.S.C. 742f(b)(1); Fish and Wildlife Act of 1956]

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM

"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." — National Wildlife Refuge System Improvement Act of 1997 (Public Law 105–57; 111 Stat. 1282)

DESCRIPTION OF USE

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

The use is forest management, including commercial timber harvesting. It 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.

The purpose of the use would be to improve and maintain habitat for forest-dependent species over the long term. Before we acquired the lands for the refuge, companies in the forest industry had owned them, and had harvested most of the upland areas for more than a century and a half. Most refuge land now supports only regenerating or young forest. The timber harvesting practices of the past had also altered species composition, forest age class, and structure. Selective harvesting favored the conversion of many spruce-fir stands to mixed stands and mixed stands to hardwoods. Much of the forested land on the refuge lacks the structure, composition, or age distribution that species of conservation concern prefer.

The refuge lacks the equipment and personnel to carry out timber harvesting. Therefore, commercial timber harvesting is the most economical, safe method of achieving many of our proposed forest management objectives.

(b) Where would the use be conducted?
We have classified refuge lands into four types of management zones, depending on their degree of resource sensitivity. In all of the zones, as the level of resource sensitivity increases, the restrictions on forest management practices will increase, following the best forest and wildlife management practices recommended by the State of New Hampshire (New Hampshire Forest Sustainability Standards Work Team, 1997; Flatebo et al. 1999; Cullen, 2000; Calhoun and DeMaynadier, 2003).

We list the timber management zones below in order of their increasing level of restrictions on timber harvesting practices (see also map C-3).

Low Resource Sensitivity Zone: Stands in this zone allow the greatest flexibility in management over the long term to diversify forest age class and structure to benefit our focal species. A variety of commercial and non-commercial timber harvesting may occur as described below under each habitat type. All harvesting will follow best forestry and wildlife management practices (BMPs) recommended by New Hampshire and Maine. Where this zone surrounds or abuts moderate-to-high sensitivity or industry-inoperable zones, the stand prescriptions for this zone will reflect the need to protect or enhance the resource values on those more sensitive zones.

Moderate Resource Sensitivity Zone: Stands in this zone are subject to silvicultural prescriptions or timing of harvest more restricted than in the Low Resource Sensitivity Zone. Those restrictions may include seasonal closures of operations, the maintenance of closed canopy conditions, the retention of coarse woody debris or snags, etc.

High Resource Sensitivity Zone: Stands in this zone are subject to very few manipulations. We may fell, girdle, or otherwise treat individual trees or small groups of trees to benefit wildlife or for safety reasons; otherwise, tree harvest will be quite limited. Highly restrictive areas may include excessively steep slopes, hydric soils, or close proximity to such resources of concern as streams and wetlands. The forest products industry also considers most of these areas inoperable (see below). However, the high resource sensitivity zone on the refuge extends beyond what the industry would consider inoperable.

Forest Industry Inoperable Zone: This zone represents local forest industry standards for inoperability. The timber company that formerly owned the land mapped this zone. It includes stands that are non-forested wetlands or are too steep or wet to be harvested economically (Johnson, 2003).

We may fell, girdle, or otherwise treat individual trees or small groups of trees to benefit wildlife or for safety reasons. The tree harvest in this zone will be quite limited.

The refuge includes approximately 10,000 acres of upland forested habitat. About 20 percent of that acreage is softwood habitat (primarily red spruce and balsam fir), 45 percent hardwood habitat (sugar maple, yellow birch, beech, red maple), and 35 percent mixed woods habitat. Only about 4,000 of those acres lie outside the boundaries of the High Resource Sensitivity Zone, and are now in a mature size class. Over the next 15 years, most of the harvesting will take place on those 4,000 acres, located primarily in Management Units 1, 4, 5, and 6 (see map C-3). However, some forest management, such as pre-commercial thinning, may take place in other areas of the refuge to meet specific wildlife or habitat objectives.

(c) When would the use be conducted?
Forest management may occur at different times of the year at different locations, depending on individual site characteristics, stand conditions, and other resource concerns. All forest management will occur at times designed to minimize unwanted impacts on resources, e.g., erosion, soil compaction, or the disturbance of wildlife, while maximizing the desired silvicultural results, such as seed germination and natural tree regeneration. To achieve specific silvicultural goals, most of the harvesting will occur in summer or winter, as appropriate. A comprehensive forest inventory will evaluate forest habitat and wildlife species of concern and determine the best timing and method before harvesting. We will not harvest timber during the primary breeding season for bald eagles, if nests are within or directly adjacent to the harvest area.

(d) How would the use be conducted?
Although we began an inventory of timber stands on the refuge in 2005, we will need additional detail before harvesting. Another inventory will help design appropriate silvicultural prescriptions to meet the objectives of our Habitat Management Plan. We will send that data and all job specifications to local and regional timber harvesting companies for bidding, and issue a special use permit to the contractor we select. Commercial timber harvest on the refuge may yield products ranging from pulpwood or firewood to saw timber or veneer.

Table C.1, below, lists the forest migratory bird species we have identified as management priorities: species of regional conservation concern whose habitat needs represent, in large part, the habitat requirements of a larger suite of species of concern. Their ties to the mixed spruce-fir/northern hardwood forest matrix are close.

Table C.1. Priority forest birds (refuge focal species)

Species	Some Major Forest Structural Requirements
Blackburnian warbler	high conifer component, large conifers (>60 ft high), closed canopy
Black-throated green warbler	high conifer component, large forest patch size, large conifers, forest gaps
Canada warbler	well-developed understory, especially along streams, bogs, wet areas; canopy gaps; structurally diverse forest floor.
American woodcock	fields or forest openings, young aspen-birch, dense brushy areas, alder

Management for focal species such as blackburnian and black-throated green warblers will also help improve habitat for other species of conservation concern, such as bay-breasted and Cape May warblers, and wintering white-tailed deer. Both bay-breasted and Cape May warblers require closed canopy conifer habitat with large trees. Quality winter cover for deer includes large trees (softwood cover over 35 feet tall) and high (70-percent) crown closure (Reay et al., 1990).

Our approaches to silviculture will differ among different habitat types in the mixed spruce-fir/northern hardwood forest matrix, but will stay within the inherent capability of those sites to grow certain species (e.g., soil properties, moisture regimes, elevation, aspect, etc). We anticipate that our management will help make our forests generally more resilient to multiple stressors, including climate change. We plan to monitor our forest systems and the impacts of our forest management strategies, and modify our management practices appropriately, as necessary. We recognize that climate change may influence the trajectory of our forest systems in unpredictable ways and anticipate that we may have to adjust our objectives and management strategies accordingly. The use of accepted silvicultural practices will perpetuate habitat types. When feasible, our management strategies will favor or increase the conifer component of stands on appropriate sites. We describe some of those strategies below.

Strategies for Spruce-Fir Habitat Type

- Improve habitat structure through pre-commercial and commercial thinning and/or stand improvement operations for focal species. We will favor spruce during stand improvements, although it is not our intent to eliminate all other softwood species.
- Regenerate this habitat type through accepted silvicultural practices. Methods will include using
  - single tree or group selection, overstory removal, clearcut, or shelterwood techniques;
  - treatments timed to optimize the ability of the site to regenerate softwood;
  - rotation age for fir will range from 60 to 100 years
  - rotation age for spruce will range from 80 to 130 years, and,
  - the size of each management unit, its silvicultural prescription and rotation age will determine the size of each treatment and the cutting interval.

- Maintain a minimum of 50 percent of each critical deer wintering area as quality shelter at any point in time. Quality shelter includes softwood cover over 35 feet tall and 70-percent or higher crown closure (Reay et al., 1990).

Strategies for the Conifer-Hardwood Mixed Woods Habitat Type

- Improve habitat structure through pre-commercial and commercial thinning and/or stand improvement operations for focal species. We will favor spruce during stand improvements although it is not our intent to eliminate all other softwood species.

- Regenerate this habitat type by using accepted silvicultural practices. Favor softwoods on appropriate sites. Methods will include

On softwood-dominated sites

- single tree or group selection, overstory removal, clearcut, or shelterwood techniques;
- rotation age for fir will range from 60 to 100 years;
- rotation age for spruce will range from 80 to 130 years;
- the size of each management unit, its silvicultural prescription and rotation age will determine size of each treatment action and the cutting interval; and,
- emphasis on overstory removal techniques that protect softwood regeneration in areas of advanced softwood regeneration

On hardwood-dominated sites

- small group selection with group sizes up to ½ acre acre;
- age class goals of 100 to 200 years; and,
- cutting cycles of 10 to 20 years to maintain understory development.

Strategies for the Northern Hardwood Habitat Type

- Improve habitat structure through pre-commercial and commercial thinning and/or stand improvement operations for focal species.

- Regenerate those habitat types through accepted silvicultural practices. Methods will include
  - small group and single tree selection with up to 0.5-acre group sizes;
  - age class goals of 100 to 200 years; and,
  - cutting cycles of 10 to 20 years to maintain understory development.

Strategies for Woodcock Focus Area Management

- In woodcock focus areas (see map C-2), use accepted silvicultural practices to create openings, understory development and early successional habitat for woodcock and Canada warbler. We will use group selection, clearcuts or patch cuts of up to 5 acres in size. We may also maintain some larger, roosting fields. Cutting cycles will be approximately 8 to 10 years on a 40-year rotation. We may permanently maintain some 3- to 5-acre openings, primarily by mowing and brush clearing using mechanized equipment. We will perpetuate aspen-birch communities in woodcock management areas, when possible.

See additional details on forest management in appendix K of our comprehensive conservation plan.

(e) Why is the use being proposed?
The primary objective of forest management will be to enhance and maintain habitat for our focal management species and associated communities. Upland forest habitat on the refuge now lacks the optimal structure, composition, and patch size those species require. Forest management can improve and accelerate the development of appropriate structures and forest composition. Without active management, the development of appropriate habitat may take longer or fail to happen at all, depending on site characteristics, prior management history, and the frequency of natural

disturbances. Forest management can also create and maintain the appropriate forest structure and age or size class distribution on the landscape into the future, so that adequate habitat is always available for species of concern. Because the refuge lacks the funding, personnel, or equipment to carry out forest management safely, commercial timber harvest and silvicultural treatments are the only reasonable alternative for accomplishing the work.

Availability of Resources

The design and oversight of a timber management program on the refuge will require the addition of a forester position. That position has been approved, but has not yet been funded. In the absence of a refuge forester, the refuge may contract the services of a private consulting forester or use other Service personnel or our partners. The sales of timber will fund the fees for consultation.

A portion of the funds generated by the sale of timber on the refuge will go into the revenue sharing fund. We will use another portion to continue the forest management program and such activities as additional stand inventories, timber marking, pre-commercial thinning, and related roadwork. When appropriate and applicable, we may include tasks such as road rehabilitation in the contract as products and include them as part of the bid. That would alleviate any additional management costs associated with this specific activity. However, it would not eliminate most of the preliminary site preparation.

We expect all harvesting to be performed near, or from, existing roads. Because we would not construct any new facilities or improvements on refuge property for this use, we expect no significant construction costs associated with it. However, funding will be necessary for the maintenance of roads and water control structures. The refuge forester will assume the management of contract development and administration, monitoring, and resource database.

We expect the required costs in the following list for the refuge to administer the proposed commercial forest management practices each year. Assuming the funding of the refuge forester position, the timber sales revenue that returns to the refuge should cover any additional costs.

Forest Inventories:	$6,000	(Refuge Forester)
Wildlife Inventory & Monitoring:	$6,000	(Refuge Biologist)
Marking Timber & skid road layout:	$20,000	(Refuge Forester)
Contact Development and Administration:	$6,000	(Refuge Manager/Refuge Forester)
Stand Inventory Data Entry and Analysis:	$1,000	(Refuge Forester)
Wildlife Inventory Data Entry and Analysis:	$1,000	(Refuge Biologist)
Road Maintenance:	$5,000	(Maintenance Worker)
Total:	$45,000	

Anticipated Impacts of the Use

In case of the unregulated harvest of timber, the following impacts could occur.

Soils
The construction and maintenance of roads and landings and the operation of heavy equipment could compact soil, cause rutting, and result in increased erosion. To mitigate those potential impacts and minimize erosion, timber harvesting and road construction on the refuge will follow the best management practices recommended by the State of New Hampshire (Cullen, 2000). Timber harvesting will occur primarily outside the refuge High Resource Sensitivity Zone, at seasons appropriate for minimizing the effects of compaction and erosion. That zone includes areas of hydric, steep, shallow, erodible soils (see map C-3).

Aquatic Resources
Unregulated timber harvest and use of heavy equipment near streams, rivers, or ponds can result in increased run-off, sedimentation, and reduced shading of streams, with concomitant increases in aquatic temperatures. Downed wood in streams may initially increase and then decrease to levels below that of streams in unharvested areas. Those factors may have detrimental effects on stream organisms, including fish, invertebrates, and amphibians. Poorly planned timber harvests and road construction can alter surface and groundwater hydrology and water storage capability. The effects of multiple harvests in a watershed can accumulate over time.

Maintaining forested buffers around streams and other aquatic resources of concern will minimize impacts on water resources and water quality. Road construction, skid trail planning, harvest operation and stream crossings will follow best management practices advocated by the states of New Hampshire and Maine to minimize the alteration of hydrology and the impacts of siltation on water quality. Harvesting will use existing forest roads whenever possible. We will keep the construction of new roads to a minimum.

Wildlife and Vegetation
The construction of roads, creation of landings, and operation of heavy equipment can result in localized impacts and the damage or destruction of understory vegetation, including rare plants. Those practices may also damage the litter layer, coarse woody debris, snags, or cavity trees important for wildlife. They may alter the moisture regimes in soil and on the forest floor in ways that affect plants and animals such as forest floor amphibians and small mammals. Whole tree harvesting can result in a reduction of downed wood in the forest system. Skidding operations may cause residual damage to trees in the stand. Residual stand damage may result in the introduction of insects or disease into an otherwise healthy stand. Harvesting may also leave the remaining trees more susceptible to wind throw, alter plant and animal communities, facilitate the spread of invasive plants, disturb wildlife temporarily, or displace it over the long term.

We will mitigate most of those impacts by placing seasonal restrictions on harvesting to avoid disturbing wildlife or damaging trees or understory vegetation, the careful layout of skid trails, the use of mechanical harvesters and pre-harvest surveys of resources of concern. We will encourage timber contractors to leave tops, branches and other downed wood on site whenever possible.

Under refuge management, the average forest age/size class and canopy closure would increase over the long term, although different age classes would be present on the landscape. The softwood component of refuge matrix forest would also increase. Habitat connectivity would increase; the fragmentation of forest habitat would decrease.

Visitor Impacts
Logging may disturb refuge visitors, cause safety issues, or detract from visitors' esthetic experience. We will temporarily close areas of the refuge undergoing active logging. Because former owners harvested much of the refuge uplands just before we acquired them, and only a small proportion of the refuge will be closed at any one time, additional impacts on the public should be minimal.

Summary
Forest management on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, and 2 ("Manage open water and wetlands" and "Manage floodplain and lakeshore habitats") and as written in the CCP. Monitoring will identify any actions needed to respond to new information and correct problems that may arise in the future.

Goal 3 as written in the CCP ("Manage upland forested habitats") will benefit greatly from, and in fact depends on, forest management. This will potentially benefit Goal 4 "Provide high quality wildlife dependent activities" of the CCP from forest management activities and woodcock management activities providing varying habitat types suitable for wildlife observation and photography and for hunting. Opportunities also exist to interpret the management activities, benefitting Goal 5 of the CCP "Develop high quality interpretative opportunities…" Goal 7 of the CCP "Develop Umbagog National Wildlife Refuge as an outstanding center for research and development of applied management practices to sustain and enhance the natural resources in the Northern Forest in concert with the LMRD program" will benefit from this activity by providing a means to research and develop management techniques through forest management. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment
As part of the comprehensive conservation planning process for the Lake Umbagog refuge, this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

___ Use is Not Compatible

_**X**_ Use is Compatible, with the Following Stipulations

Stipulations Necessary to Ensure Compatibility
Our management philosophy is to create a forest management program that improves refuge wildlife habitat while simultaneously contributing to the forest industry and local economy of Coos and Oxford counties.

To protect refuge resources of concern, we will follow the best management practices for timber harvest and wildlife habitat recommended by the States of New Hampshire and Maine (New Hampshire Forest Sustainability Standards Work Team, 1997; Flatebo et al. 1999; Cullen, 2000; Calhoun and DeMaynadier, 2003; Smith and Whitney, 2001; Chase et al. 1997, Reay et al. 1990).

When the states recommend a range of best management strategies and buffer distances, we will implement the most conservative of those recommendations. The refuge may exceed state recommendations in some cases, for specific resource protection objectives.
We will plan roads, skid trails, water crossings, and landings in a way that minimizes damage to resources and stabilize roads and skid trails after harvesting.

Snags, live cavity trees, and large coarse woody debris will be retained, as appropriate, to meet refuge objectives. At the discretion of the refuge manager, the creation of snags, live cavity trees, or coarse woody debris, or the removal of individual trees or groups of trees may occur in any area of the refuge, including High Resource Sensitivity Zones, for specific wildlife management or safety purposes

We will review the forest management program annually in our Habitat Management Plan to ensure that the program contributes to refuge objectives for wildlife and habitat.

Before harvests, resource surveys will ensure that resources of concern have been identified and impacts minimized or eliminated.

Timber harvesting will occur at times that are seasonally appropriate for the site and silvicultural objectives and likely to minimize impacts on wildlife: e.g., outside raptor or heron nesting seasons.

We will discourage whole tree harvesting and encourage contractors to leave tops, branches, and other wood debris on site.

No commercial harvesting will occur on hydric soils or on slopes over 30 percent delineated on map C-3.

Except at the refuge manager's discretion to meet specific management objectives for wildlife or habitat, no harvesting will occur on forested wetlands, which include floodplain forest and northern white cedar, black spruce, and hardwood swamps.

We will use adaptive management in assessing and modifying silvicultural prescriptions to achieve wildlife habitat objectives.

Management actions will ensure the future growth of the forest and sustainable productivity consistent with ecological conditions.

Features in the implementation of the habitat management plan will ensure the application of new scientific, social, and economic information to improve silvicultural and management practices and enhance environmental and financial performance.

Justification
We have determined this use to be compatible, provided the stipulations necessary to ensure its compatibility are implemented. Forest management will contribute to the purposes for which the Lake Umbagog refuge was established and the mission of the Refuge System, and facilitate the ability of the refuge to meet its wildlife management objectives. The use will not pose significant adverse effects on refuge resources, interfere with the public use of the refuge, or cause an undue

administrative burden. We may adjust the habitat management program on the refuge annually to insure its continued compatibility. Forest management on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul L Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
(Signature and Date)

Mandatory 10 year Reevaluation Date: January 9, 2019

Literature Cited

Calhoun, A.J.K. and P. deMaynadier. 2003. Forestry habitat management guidelines for vernal pool wildlife in Maine. U.S. Environ. Protect. Agency, Boston, MA.

Chase, V., L. Deming and F. Latawiec. 1997. Buffers for wetlands and surface waters: a guidebook for New Hampshire municipalities. Audubon Soc. of New Hampshire

Cullen, J.B. 2000. Best management practices for erosion control on timber harvesting operations in New Hampshire. NH Dept. of Resources and Economic Development, Div. of Forests and Lands, Forest Info. and Planning Bureau and Univ. of New Hampshire Coop. Extension.

Flatebo, G., C.R. Foss and S. K. Pelletier. 1999**.** Biodiversity in the forests of Maine: guidelines for land management. C.A. Elliott, ed. Univ. of Maine Coop. Extension. UMCE Bulletin # 7147.

New Hampshire Forest Sustainability Standards Work Team. 1997. Good forestry in the granite state: recommended voluntary forest management practices for New Hampshire. N.H. Div. of Forests & Lands, DRED and Soc. for the Protection of NH Forests.

Reay, R.S., D.W. Blodgett, B.S. Burns, S.J. Weber, and T. Frey. 1990. Management guide for deer wintering areas in Vermont. Vermont Dept. of forests, Parks 7 Rec. and Dept. of Fish & Wildlife.

Smith, S. and S. Whitney. 2001. Guide to New Hampshire timber harvesting laws. Univ. of New Hampshire Coop. Extension.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads and antlersheds

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document? **Establishing EA**	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 __X__ 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. **(See Compatibility Determination for Justification).**

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

Not Appropriate_____ **Appropriate** __X__

Refuge Manager: Paul L Carey Date: 1-6-09

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: Judith M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads and antlersheds

Narrative

The gathering of these materials is a long-standing and continuous use of the area and fosters a connection to, and appreciation for, the area's natural resources. We recognize that picking and gathering blueberries, raspberries, blackberries, mushrooms, fiddleheads and antler sheds has occurred on the refuge for many years. Current levels of this use are low and this use often occurs concurrently with other public uses including priority public

COMPATIBILITY DETERMINATION

USE: Recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds for personal use.

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901 (b)
2. Migratory Bird Conservation Act (16 U.S.C. 715d)
3. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))
4. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

PURPOSE(S) FOR WHICH ESTABLISHED:

1. the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions. 16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986)

2. for use as an inviolate sanctuary, or for any other management purpose, for migratory birds 16 U.S.C. 715d (Migratory Bird Conservation Act)

3. for the development, advancement, management, conservation, and protection of fish and wildlife resources 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956)

4. for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
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:

1. What is the use? Is the use a priority public use?
Primary Use: The primary use is recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads and antler sheds. This is not a priority use of the National Wildlife Refuge System.

2. Where would the use be conducted?
The use would be conducted throughout the refuge.

3. When would the use be conducted?
These uses are seasonal in nature, as they naturally occur. Antlersheds are typically found during the late winter to early spring. Fiddleheads are typically gathered in early spring. Blueberries, blackberries, strawberries, and raspberries are typically gathered from July to September and mushroom may be available at varying times during the growing season.

4. How would the use be conducted?
We are proposing to open the Refuge to recreational gathering of natural materials for personal use. The gathering of these materials is a use of the area and fosters a connection to, and appreciation for, the area's natural resources. We recognize that picking and gathering blueberries, raspberries, blackberries, mushrooms, fiddleheads and antler sheds has occurred on the refuge for many years. Current levels of this use are low and this use often occurs concurrently with other public uses including priority public uses.

Natural materials gathered on the refuge are for private use only. Any sale of these materials would be considered a commercial use of these materials and is prohibited by federal law. This use specifically does not include recreational gathering of cranberries because they occur in our highest priority habitat, wetlands. Cranberries occur in bog systems that are especially sensitive to trampling. Since the refuge was established under the Emergency Wetland Resources Act and wetlands are our highest priority habitat, we do not feel that the risk of damage to these systems is warranted for recreational gathering of cranberries. Fields along Pond Brook Road in the Town of Magalloway Plantation are not open to the general public for berry picking. These fields include those formerly owned by Mr. Claude Linnell. Mr. Linnell retained life use of the rights to pick berries on those fields. These fields will be clearly marked with signs facing Pond Brook Road stating "Area Closed to Berry Picking, Rights Reserved by Previous Landowner."

At the discretion of the Refuge Manager, some areas may be seasonally, temporarily, or permanently closed to gathering of natural materials if wildlife or habitat impacts, or if user conflicts become an issue. Furthermore, the Refuge Manager may modify daily and yearly limits of natural materials to be collected. No plants may be introduced or transplanted on refuge lands to promote recreational gathering of berries and no plants are to be removed from the refuge.

5. Why is the use being proposed?
Gathering of these natural materials has occurred in the area for many years and this use was specifically requested during the public review phase of the draft EIS/CCP for Lake Umbagog NWR. Current use levels for this activity are very low and the use primarily occurs along roads and in disturbed areas like log landing and roadsides. This use is typically a family activity and provides an opportunity for family to connect with the natural environment. While people engage in this activity they often observe and gain an appreciation for wildlife.

6. Availability of Resources:
The resources necessary to provide and administer this use are available within current and anticipated refuge budgets. Staff time associated with the administration of this use is primarily related to answering general questions from the public and monitoring impacts of the use on refuge resources. This activity is administered by the refuge staff who assess interactions among user groups and any

related user impacts. Resource impacts will be monitored by refuge staff, under the supervision of the Refuge Manager. The use of refuge staff to monitor the impacts of public uses on refuge resources, and visitors is required for administering all refuge public uses. Therefore, these responsibilities and related equipment are accounted for in budget and staffing plans.

Costs associated with gathering natural materials are estimated below:

Routine maintenance:	$100	annually. This is the expected cost to maintain the signs along Pond Brook Road.
Supplies and materials:	$200	This includes signage for brochures (produced in house)
Monitoring:	$1,000	annually.
Law Enforcement:	$2,000	annually for a Refuge Officer.
Total:	$3,300	

We do not anticipate charging fees.

Anticipated Impacts of the Use:
Gathering of natural materials has the potential to cause trampling of vegetation and disturb wildlife. However, we do not expect these disturbances to be significant, i.e. cause wildlife or habitats to be negatively impacted, since current and anticipated levels of use are low. Providing the opportunity for recreational gathering of natural materials on the refuge provides the public with an opportunity to observe wildlife and to view Service wildlife habitat management projects. There have been no indications that the current levels of limited harvesting of these natural materials causes problems for wildlife other than minimal and temporary disturbance caused by the mere presence of humans.

Therefore, the gathering of these natural materials on Lake Umbagog National Wildlife Refuge as described poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:
As part of the comprehensive planning process for Lake Umbagog refuge, this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- A Refuge Officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.

- Recreational gathering of cranberries will not be allowed due to potential impacts to wetland vegetation.

Justification:
Recreational gathering of these materials on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul J Casey 1-6-09
Signature and Date

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
Signature and Date

Mandatory 10-year Re-evaluation Date: January 9, 2019

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Snowmobiling and recreational dogsledding on snowmobile trails

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document? **Establishing EA**	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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** X

Refuge Manager: Paul F. Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Snowmobiling and recreational dogsledding on snowmobile trails

Narrative

Snowmobiles and dogsleds provide a means of accessing the refuge in the winter months, and can provide an opportunity for visitors to engage in wildlife-dependent recreation. Snowmobile users and dogsled users have been observed engaging in wildlife-dependent recreation.

Before the establishment of the refuge, an extensive snowmobile trail system in northern New Hampshire and western Maine connected to trails in neighboring states and Canada. Estimates of snowmobile trails in Coos County alone exceed 1,000 miles. In 2001, the refuge acquired 4,375 acres of land west of Mountain Pond Road in Errol, N.H., from John Hancock Mutual Life Insurance Co. Those parcels came with a pre-existing agreement (1992) between the landowners at the time (James River Timber Corporation and Irving Pulp and Paper, Ltd.) and the State of New Hampshire. It states that New Hampshire can maintain a snowmobile trail near Mountain Pond and Eames roads, subject to a number of conditions. The Service is following through on earlier commitments and ensuring that it continues to work effectively with the affected States.

Snowmobile recreation is a critical part of the local economy during winter months and that of northern New Hampshire. Our "Final Environmental Assessment; Proposal to Protect Wildlife Habitat, Lake Umbagog, Coos Co., N.H., Oxford Co., Maine" (USFWS, 1991) states "The Mountain Pond [snowmobile] trail…would not be affected by this proposal." Dogsledding is allowed in both states on snowmobile trails.

COMPATIBILITY DETERMINATION

USE: Snowmobiling and recreational dogsledding on snowmobile trails

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C. 3901 (b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))
4. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions…" [16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986]

2. "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds…" [16 U.S.C. 715d; Migratory Bird Conservation Act]

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…" [16 U.S.C. 742f(a)(4); Fish and Wildlife Act of 1956]

4. "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" [16 U.S.C. 742f(b)(1); Fish and Wildlife Act of 1956]

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
"The mission of the 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 snowmobiling. It 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), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Dogsledding is a supported use since it is allowable on the snowmobile trail systems in both New Hampshire and Maine.

(b) Where would the use be conducted?
We propose to permit snowmobile use on established snowmobile trails that pass through the refuge, (15.4 miles on current refuge lands), in their approximate, present locations (map C-4). We may occasionally close or reroute trails, depending on their biological impacts or refuge management activities. We will not allow the use of snowmobiles on spur trails or on any other trails not designated on map C-4.

Before the establishment of the refuge, an extensive snowmobile trail system in northern New Hampshire and western Maine connected to trails in neighboring states and Canada. Estimates of snowmobile trails in Coos County alone exceed 1000 miles. In 2001, the refuge acquired approximately 4375 acres of land located west of Mountain Pond Road, in Errol, NH, from John Hancock Mutual Life Insurance Co. These parcels came with a pre-existing snowmobile agreement (dated 1992) between the landowners of the time (James River Timber Corporation and Irving Pulp and Paper, Ltd) and the State of New Hampshire. It states that New Hampshire can maintain a snowmobile trail near Mountain Pond and Eames Roads, subject to a number of conditions.

New Hampshire Trail 18 is the only state-corridor snowmobile trail on refuge property (see trail 18, map C-4). A 5.4-mile-long segment of that trail crosses the refuge on Mountain Pond Road, a gravel road that runs north to south on the east side of Errol Hill. We re-routed a short segment of that trail, used only when there is enough snow cover, around our newly constructed maintenance shop. A 1.2-mile-long spur trail off trail 18 heads east along Potter Farm Road from the intersection of Mountain Pond Road and the Potter Farm road exiting refuge property onto state land and eventually Umbagog Lake. The Umbagog Snowmobile Association in Errol, NH maintains the combined 6.6 mile portion of trail through refuge property.

A short, 0.2-miles connector trail between the Bull Moose in Cambridge, NH and the Upton trail system in Maine crosses a corner of a 55-acre parcel of refuge land. The trail follows old Route 26 roadbed, and crosses a stream on the concrete bridge that served traffic on Route 26.

No Maine Interconnected Trail System (ITS) corridor trails cross refuge property. However, a number of long-standing trail segments cross refuge land in Maine. In Upton, a 0.25-miles segment crosses the refuge near Mill Street. That trail connects the southeast arm of Umbagog Lake to the Upton trail system by following and old skid trail.

On Tidswell Point, a 2.6-mile segment of snowmobile trail crosses refuge land on a gravel road. It originates at the south arm of Umbagog Lake, crosses state land, and connects to another gravel road just off refuge property that leads from Inlet Ridge to the Dead Cambridge River and, eventually, to East B Hill Road. That trail passes approximately 150 feet from a bald eagle nest and, therefore, may be subject to seasonal closure around February 15 to the end of the season to protect the nesting eagles.

An approximately 500-foot trail from a gravel road to Pebble Beach in Tyler Cove also crosses refuge land, and serves as a connector to Umbagog Lake. A similar, approximately 600 foot trail segment

connects the gravel road from B Brook Cove to the gravel road in a similar fashion. Those trails exist on existing skid roads. A third lake-access trail in Sturtevant Cove is 0.3 miles long. Approximately 500 feet of this trail is on a skid road; the remainder is on gravel road.

Near Pine Point, an approximately 0.4 mile trail segment crosses refuge property on the gravel road that provides access to private camps there.

In the area of Sunday Cove, approximately 3.6 miles of snowmobile trails cross refuge land. Those trails follow dirt and gravel roads and connect to Middle Dam on Lower Richardson Lake. One spur trail off of those trails leads to the Maine Warden's camp in Sunday Cove. The trails in the area of Sunday Cove will be the first we will assess, because overlay maps show that they may cross wetlands and cross through white-tailed deer winter yards. If we deem any changes necessary, we will work with Maine Department of Inland Fisheries and Wildlife, neighboring landowners and the Town of Magalloway Plantation in seeking alternate routes of travel.

In Magalloway Plantation, approximately 1.2 miles of trail crosses refuge lands south of Sturtevant Pond. This trail follows the Transfer Station road to a dirt road and out into open fields where it exits across from the Magalloway Church.

(c) When would the use be conducted?
We will open the trails identified above (map C-4) for snowmobiling when snow conditions are suitable, but no earlier than December 15 and no later than April 10.

(d) How would the use be conducted?
The operation of snowmobile on the refuge shall comply with all applicable state rules and regulations. We will not permit competitive snowmobiling events. The speed limit on the refuge will be 35 mph, unless otherwise posted. No parking areas will be provided on the refuge. No ATVs are permitted on refuge trails.

Refuge lease holders may request a special use permit to access their camps by snowmobile in winter, if no other access is practical. At the discretion of the refuge manager, that authorized use shall extend only to accessing the camp by the most direct route, which the special use permit will define, while minimizing impacts to refuge resources of concern. No new trails may be constructed.

The refuge will issue special use permits to the States of New Hampshire and Maine or other responsible parties (e.g. snowmobile clubs, volunteers) to maintain trails. Those permitted parties are responsible for accomplishing all trail maintenance, grooming, and infrastructure repair, including bridge and culvert repair and maintenance. Bridge and culvert construction must follow best management practices to avoid erosion or increasing siltation of sensitive streams. Culverts should be designed to handle the largest predicted stream flows. Any trail not on a road, shall not exceed 16 ft. in width at any point. All trail improvements must receive prior approval from the refuge.

The States of New Hampshire and Maine and other parties are also responsible for placing trail junction, trail number, safety, closure, and speed limit signs along the trail prior to December 1, maintaining them through the period of snowmobile use, and collecting signs and picking up any litter

at the end of the season. Trail maintenance may include cutting brush and removing fallen logs, but removal of brush or other vegetation should be kept to a minimum.

We do not currently monitor snowmobile use, but it is possible to estimate the current levels of use. Grey (2005) estimated that as many as 22,000+ snowmobiles may visit the Errol area annually. Since a major corridor trail is located on the refuge, it is likely that a high percentage of these snowmobiles also pass through the refuge.

Dogsled use of snowmobile trails is currently very light, but it appears from the number of inquiries and vehicles that interest in the refuge for dogsledding is increasing. Recreational dogsledding is only allowable on the above listed snowmobile trails. A permittee has the authority to use some other trails on the refuge, but these will not be available for public use in general.

We intend to monitor snowmobile trail use via winter surveys and/or traffic counters. We will also monitor the condition of trails, culverts, bridges, and streams in spring and summer, and identify and close undesignated trails on the refuge.

(e) Why is this use being proposed?
Snowmobile recreation is a critical part of the local economy during winter months for generations… and that of northern New Hampshire. Our "Final Environmental Assessment; Proposal to Protect Wildlife Habitat, Lake Umbagog, Coos Co., NH, Oxford Co., ME" (U.S. Fish and Wildlife Service, 1991) states " The Mountain Pond [snowmobile] trail…would not be affected by this proposal. Snowmobiling would not be allowed on the central Refuge area, but no trails are currently identified in that area".

Snowmobiles provide one means of accessing the refuge during the winter months, and can provide an opportunity for visitors to engage in wildlife-dependent recreation. Snowmobile users have been observed engaging in wildlife-dependent recreation on other national wildlife refuges (cf. Nulhegan Basin Division of the Silvio O. Conte National Fish and Wildlife Refuge, Compatibility Determination, Snowmobile Access, 1999) and national parks (Davenport and Borrie 2005).

Availability Of Resources:
With the hiring of a refuge officer, and a zone officer for Vermont and New Hampshire, the resources necessary to provide and administer this use, at its present levels, are available within current and anticipated refuge budgets. Staff time associated with administration of this use relates to overseeing trail maintenance, issuing special use permits and monitoring compliance with their conditions, enforcing laws, monitoring public use, and monitoring impacts on natural resources.

The refuge manager will administer the program. A wildlife biologist will monitor its effects on refuge resources. The refuge officer will monitor visitor use and conduct law enforcement for visitor safety and resource protection.

We estimate below the annual costs associated with the administration of snowmobiling on the refuge.

Overall Oversight of Program; Coordinate with States of NH and Maine:	$2,000	GS-13 Refuge Manager
Issue-administer SUPs/Coordinate with Snowmobile Clubs/Oversight of trail maintenance:	$2,000	GS-12 Deputy Refuge Manager
Law enforcement–patrol/visitor-resource protection/ public use monitoring/enforcement/outreach:	$3,000	GS-7 Refuge Officer
Resource impacts/monitoring:	$3,000	GS-12 Wildlife Biologist
Snowmobile gas/maintenance:	$1,000	
Total:	$11,000	

All maintenance of snowmobile trails will be the responsibility of the States of New Hampshire and Maine and other responsibility parties (snowmobile clubs, volunteers, etc.). The refuge owns and operates snowmobiles for carrying out law enforcement, refuge operations, and monitoring public use. Officers from the New Hampshire Fish and Game and Maine Department of Inland Fisheries and Wildlife occasionally supplement law enforcement coverage on the refuge, at no cost to us.

ANTICIPATED IMPACTS OF THE USE:
Only New Hampshire Trail 18 has been evaluated in any detail, using refuge biological survey data and the refuge GIS (geographic information system). Where it passes through the refuge, Trail 18 is located both on a grassy track and on gravel roads. In several places, it crosses snowmobile bridges over small steams. The trail passes primarily though northern hardwood and mixed hardwood-conifer forest, as well as a small area of mixed pine-hemlock forest. The Potter Farm Rd. spur trail passes within less than 0.1 miles of a mature northern white cedar swamp located on State of New Hampshire property and inventoried by the New Hampshire Heritage Program. Some of the cedars in that swamp exceed 200 years in age.

We have recorded more than 50 species of birds in areas of the refuge Trail 18 traverses. Common species include red-eyed vireo, ovenbird, black-throated blue warbler, chestnut-sided warbler, hermit thrush, magnolia warbler, black-throated green warbler, American redstart, yellow-bellied sapsucker, black-capped chickadee, and ruffed grouse. Many of those species are migratory and, thus, are not present during the snowmobile season. Streams the trail crosses are known to support populations of northern two-lined and dusky salamanders. Vernal pools with populations of wood frogs and spotted salamanders occur in some areas. Although road, bridge and culvert conditions can affect their water quality, vernal pools generally dry up by fall and stream salamanders are usually inactive in the winter months. White-tailed deer, moose, and fisher are known to frequent the trail area. The trail does not cross through any known deer wintering areas and we know of no raptor (osprey, eagle) nests immediately adjacent to the trail. The nearest osprey nests are about 0.5 mi to the east of the trail. The trail approaches within <0.1 mi of Mountain Pond and its associated wetlands. A literature review of potential impacts of snowmobiling on wildlife and wildlife habitat follows:

Wildlife Impacts:
Winter is a particularly stressful time for many species of resident wildlife, because of the reduced availability and quality of food and the higher energetic costs of snow travel and thermoregulation. Late winter is a particularly vulnerable time for many species (especially ungulates), because snow depths are often greatest, the animals are in their poorest condition, and food resources have been exhausted.

Snowmobiles are capable of covering large areas and thus have the potential for disturbing wildlife and compacting snow over a large area, if they are not confined to designated trails (Hammitt and Cole 1998).

Some potential negative impacts of snowmobiling (and other forms of human disturbance) on wildlife include:

1. Increased energy expenditure. Disturbance may result in increased heart rate, activity, or actual flight, all of which have an energetic cost. During severe winters or for animals in poor or marginal condition, the additional stress of disturbance may result in exhaustion of an individual's food reserves, and lowered resistance to disease or predation. That may affect survival or reproduction. Animals may be in poorer condition going into the spring breeding season.

2. Displacement to suboptimal habitat. Animals may be forced into habitats where foraging or cover are of lower quality. This may increase energetic costs, increase vulnerability to predation, or increase crowding and disease transmission. It may alter the distribution of animals on the landscape.

3. Alteration of behavior. Disturbed animals may change their foraging times to periods when energy losses or exposure to predators is higher.

4. Changes in community composition and inter-species interactions.

5. Improved predator access to prey wintering areas (a benefit to predators, but a negative impact to prey).

6. Direct mortality from snowmobile-wildlife collisions.

Some potential, positive impacts of snowmobiling and other forms of human disturbance on wildlife follow.

1. Reduced energy expenditure. Snow compaction and trail creation by snowmobiles may reduce energy expenditure in deep snow, for animals that follow snowmobile trails.

2. Improved access to resources. Snow compaction and trail creation by snowmobiles may expand access to foraging areas, for animals using trails.

Although a moderately extensive body of literature treats the impacts of snowmobile activity on wildlife, particularly ungulates, the site-specific nature of much of the research and the complex

interactions among the factors affecting wildlife make interpreting results and extrapolating them for Lake Umbagog difficult. The differences in methodology among studies make it difficult to compare them, and have compounded the problem. As a result, different studies have found apparently contradictory results that seem to be applicable only locally.
A few of the variables that may affect the type and degree of wildlife response to snowmobiles include the

- severity of winter snow conditions,
- type of vegetation or habitat,
- topography,
- time of day and month of year,
- level of habituation to disturbance,
- animal age and condition,
- species type,
- animal density and group size,
- animal activity type (standing vs. bedded down),
- intensity of hunting,
- intensity of snowmobile activity,
- duration of disturbance, and
- behavior of snowmobile users.

Mammals may show less of an overt response to human disturbance when winter conditions are particularly severe and energy conservation is at its most critical (Knight and Cole, 1995). Impacts may be at the individual or population scale and may be either short- or long-term.

Despite the apparent contradictions in the literature, many studies seem to indicate that snowmobiling may affect wildlife under certain conditions. Although population level impacts may exist, only impacts at the individual and local level have been demonstrated. Appropriate management can mitigate many of the negative effects.

Ungulates (White-tailed deer; Moose):

White-tailed deer expend more energy in winter than at other times of the year. To compensate, deer usually conserve energy by restricting their movements, particularly in late winter, when they lack fat reserves and snow is deeper, rather than increasing their food intake by foraging more widely (Moen, 1976). Energy conservation measures include walking slowly, on level ground. Thus, they are particularly vulnerable to disturbances that counter that energy conservation strategy.

Most ungulates react more strongly (are more likely to flee, travel a greater distance) to a person on foot than a person on a snowmobile. Stopping or getting off a vehicle creates more disturbance than a person on a continuously moving snowmobile (Oliff et al. 1999). Response to snowmobiles is greater in areas open to hunting than in areas closed to hunting.

In Yellowstone National Park, heavy human activity was found to temporarily displace most wildlife from an area within about 190 feet of the trail (Oliff et al. 1999). However, at greater distances, responses of elk and bison to snowmobiles were generally infrequent and brief (White et al. 2004).

No active flight responses were seen at distances greater than 650 ft. Response intensity increased with increasing size of a snowmobile group. White et al. (2004) concluded that energetic costs to elk from snowmobile disturbance were low, and that there were no population-level impacts on elk. The disturbance of wildlife tends to be less when human activities are fairly predictable both in location and behavior. Animals may habituate to predictable disturbance, and show less of a behavioral or physiological response. Snowmobile activities on fixed designated trails create fewer disturbances than activity that occurs randomly across the landscape. (Oliff et al. 1999).

Wildlife seem to demonstrate a less intense response to disturbance when there is some sort of visual barrier between them and the source of disturbance created by vegetation and/or topography (Oliff et al. 1999).

Deer and moose are more likely to forage in the early morning or evening, therefore, these are the times they are most likely to encounter, and possibly, be disturbed by snowmobiles (Oliff et al. 1999).

Severinghaus and Tullar (1975) suggested that snowmobile disturbance might be energetically costly to deer. Although deer sometimes use snowmobile trails, those trails may not lead to the best foraging areas, or may help to concentrate foraging in a restricted area and contribute to over-browsing. They recommended keeping snowmobile trails at least 0.5 miles from deer wintering areas.

In a controlled experiment, Freddy et al. (1986) found that snowmobiles invoked flight responses in mule deer at distances < 440 ft. Distances traveled by fleeing deer averaged 330 ft. Deer demonstrated low levels of response (alerting) up to distances of about 1540 ft. Freddy et al. suggest that keeping snowmobile trails > 1500 ft from deer would minimize any disturbance. The study found no evidence of increased mortality or impairment of reproduction, but deer may not have been disturbed often enough to show an effect.

Eckstein et al. (1979) experimentally exposed white-tailed deer to snowmobile activity, and found no differences in home range size, habitat use, or activity by white-tailed deer in areas with snowmobile activity vs. areas without it. However, deer were displaced from an area within 200 ft. of snowmobile trails. The study found that deer were less disturbed by snowmobile activity at night than during the day. Deer were found to use snowmobile trails occasionally, but did not seem to use snowmobile trails in preference to their own trails, or follow snowmobile trails beyond their normal wintering area. They concluded that, although there might be some energy savings for the deer from using snowmobile trails, the effects of snowmobiles forcing deer off trails would counter balance those savings. They also recommended that snowmobile trails avoid deer wintering areas by rerouting through upland deciduous forest wherever possible.

Richens and Lavigne (1978) also found that white-tailed deer in Maine sometimes used snowmobile trails for short distances (< 660 ft), especially when they were near bedding areas. Deer were more likely to use snowmobile trails under more severe winter conditions, when snow depths were greater. Deer were less likely to use snowmobile trails on wide logging roads that were less sheltered. Unlike the Eckstein et al. (1979) study, Richens and Lavigne found that deer could be persuaded to follow snowmobile trails over a mile beyond their own trail system when improved forage was provided at the new location. The study suggests that snowmobile trails could be laid out in deer wintering areas in a way that could benefit deer, by improving their mobility, reducing energy costs, and providing

access to better foraging areas. Deer continued to use bedding areas close to snowmobile trails and did not appear to alter their activity patterns in response to snowmobiles, but snowmobile traffic in their study area was relatively light. The flight responses of deer to snowmobiles varied, depending on severity of winter, snow depth, type of cover, and time of day. Deer were more likely to flee from snowmobiles in early winter than in late winter. The poor condition of deer towards the end of winter may have contributed to this reduction in flight tendency. Richens and Lavigne also found deer were more likely to flee from snowmobiles traveling at high speeds than at low speeds (< 10 mph).

In contrast to some other studies, Dorrance et al. (1975) found increases in white-tailed deer home range size, movement, and distance to snowmobile trails with increased snowmobile activity for an area previously closed to snowmobile use (but open to hunting). Deer failed to show these changes in movement patterns with increased snowmobile activity at a second study site that was open to snowmobile traffic but closed to hunting. At the second site, deer were displaced from the immediate vicinity of active snowmobile trails, but usually returned shortly after snowmobile activity stopped. That effect was seen even at very low levels of snowmobile activity. The habituation of deer to snowmobile activity may have been facilitated at this second site, where hunting was not permitted. However, in this study, displacement of deer from snowmobile trails probably did not result in a significant impact on deer except during particularly severe winters and/or on poor winter ranges.

Huff and Savage (1972) found that white-tailed deer in Minnesota utilized conifer (jack pine) areas with dense canopy cover during the middle of the week when snowmobile traffic was light, but shifted to a more open canopy aspen-birch stand during weekend heavy-use periods. They reported that radiant heat loss was higher in the aspen-birch stand than in the jack pine.

Even animals that do not show an overt change in behavior, such as flight, in response to disturbance, may still undergo physiological changes indicative of stress. Creel et al. (2001) measured glucocorticoid of elk exposed to snowmobile activity in Yellowstone National Park. Elevated glucocorticoid secretion is indicative of stress, and if prolonged, can impair immune system and reproduction function. Elk were found to have higher glucocorticoid levels during snowmobile season than immediately post-season. In addition, glucocorticoid levels were found to increase with increasing daily snowmobile activity. Despite increased stress on elk during snowmobile season, Creel found no evidence that survival or reproduction of elk was being affected. Similarly, Moen (1982) found that heart rates of captive white-tailed deer increased when they were approached by snowmobiles, even when no change in their behavior was discernible. Deer also failed to habituate to snowmobiles (as measured by elevated heart-rates) over the course of the experiment. Moen (1982) suggested that there might be an energy cost to elevated heart-rate.

Although moose are considerably better adapted to deep snow and winter conditions than deer, severe winters can still stress them if food supplies are exhausted or if they are in poor condition. Like deer, moose tend to reduce their activity levels in winter as an energy conservation measure, and disturbances that cause them to increase their activity come at an energetic cost.

Collescott and Gillingham (1998) found that moose that bedded down within approximately 1000 ft. of an active snowmobile trail, or fed within 500 ft. of snowmobile traffic were likely to change their behavior in response to snowmobile disturbance. Moose within 1000 ft of snowmobile traffic were sometimes temporarily displaced into less favorable foraging habitat. However, they did not find

a significant impact on moose activity patterns within their study area associated with snowmobile traffic. Moose, in general, appear to habituate fairly readily to vehicle activity and will flee at shorter distances if they have become habituated.

Black Bears
Black bears will abandon den sites if humans on foot disturb them sufficiently, and may abandon cubs (Goodrich and Berger 1994). Bears that abandon or change dens may remain active longer and experience more weight loss than undisturbed animals. Bears are particularly vulnerable to disturbance just before denning (generally November- December), and just after they emerge from dens in the spring (March-April) (Oliff et al. 1999).

Other Carnivores (Fisher, marten, weasels, red fox, coyote)
Little research has been done on disturbance affects on any of these species. However, fishers do not appear to alter their activity significantly in response to moderate levels of human disturbance. When disturbed, females fishers may move their den sites (Oliff et al. 1999). Weasels and pine marten frequently tunnel under the snow when foraging. Snow compaction caused by snowmobile trails may affect their foraging ability locally, as well as negatively impact prey populations (small mammals).

Neumann and Merriam (1972) found that red foxes exhibited greater levels of activity near snowmobile trails and were using trails as travel corridors. Creel et al. (2001) also found that wolves used snowmobile trails in conditions of deep snow. Coyotes increase their use of snowmobile trails during severe winters as well (Crete and Lariviere, 2003).

Other Mammals (snowshoe hare, small mammals)
Neumann and Merriam (1972) found that hare activity was reduced within 250 ft. of snowmobile trails. They also found that a single passage of a snowmobile could significantly alter the insulating properties and temperature gradient of snow to a depth of two feet. Those changes in temperature regime were potentially great enough to increase energy costs to small mammals burrowing under the snow.

Jarvinen and Schmid (1971) found a significant increase in mortality of small mammals in an area where snow had been compacted experimentally by snowmobiles. Small mammals did not appear to migrate off-site in response to snowmobile activity. They suggested that causes of mortality might have been related to the reduced insulating capacity and increased thermal conductivity of the compacted snow which may have increased thermal stress on animals. Snow compaction may also have limited movement of animals and reduced the permeability of the snow to a point that inhibited gas exchange and increased levels of carbon dioxide above normal. If extensive, off-trail snowmobile activity compacts large areas of snow, the impacts on small mammal populations may be significant (Olliff et al. 1999).

Birds
Bald eagles appear to remain near Umbagog Lake throughout the winter. Eagles are particularly sensitive to disturbance early in the breeding season, including the period from nest site selection through incubation. Disturbed birds may abandon a nest site. As with other species, predictable traffic along designated routes appears to produce the least amount of disturbance. Random

movement by snowmobiles, together with high operator visibility, may make snowmobiles particularly disturbing to eagles (Oliff et al. 1999). Eagles foraging on the ground or on carcasses on ice are especially sensitive to disturbance (Oliff et al. 1999).

Migratory birds that breed in the refuge depart for their wintering habitats long before snowmobile use starts, and typically do not return before it ceases. Bald eagle nesting activity generally begins in the Umbagog area in late winter-early spring (February-March). The potential therefore exists that snowmobile activity could impact eagles. Winter eagle management guidelines for Yellowstone National Park (Oliff et al. 1999) recommend a buffer of up to1300 feet around frequently used foraging and perching locations (depending on visual screening from topography and/or vegetation), and a quarter-mile to half-mile buffer around nest sites.

Anticipated impacts of snowmobile activity on refuge wildlife include displacement of wildlife immediately adjacent to trails and some potential for contamination of streams with sediment or exhaust. The current route of New Hampshire Trail 18 traverses mixed and hardwood forest, and does not pass through any known deer wintering areas, nor does it closely approach any known eagle or other raptor nest sites. Trails on the Maine side of the refuge may pass through deer wintering areas, near raptor nests, and/or through sensitive wetlands. We will assess these trails and may re-route or close some of them if significant resource impacts seem likely. Installation of well-constructed and maintained culverts or bridges over stream crossings should help to minimize the contamination of streams and impacts to stream amphibians. Much of the disturbances to wildlife are from snowmobiles that are not on a designated trail and are traveling all over the landscape in unpredictable ways. Restricting snowmobile traffic to designated trails helps to increase predictability. Most existing trails have been in place for decades and predate the establishment of the refuge.

Habitat Impacts

Vegetation
Several studies have found snowmobile damage vegetation. That may involve direct, mechanical damage as well as the alteration of soil and substrate conditions important for plant growth. The extent of impacts depends on the plant species, their sensitivity to cold and mechanical damage, snow depth, winter severity, and soil type and slope, among others.

Neumann and Merriam (1972) found that after a single passage by a snowmobile, over 25 percent of all tree saplings at or above the snow surface were damaged severely enough to cause mortality. Seventy-eight percent of saplings showed some signs of damage. Species with rigid woody stems were the most vulnerable. All vegetation above the snow surface was eliminated mechanically in heavily traveled areas.

Wanek (1974; 1971) found that soil temperatures were significantly colder and more variable under snowmobile trails than under un-compacted snow. That change occurred after the first snow compaction event. Soil froze sooner, deeper, and remained frozen for a longer time than under un-compacted snow. Soils under snowmobile tracks thawed out as much as 3 weeks later than under control areas. Temperature regimes varied, depending on the soil type. Sandy soils remained colder in the winter than did organic soils. Soil temperatures under hardwood forests remained colder

than under softwoods. The growth of microbial populations in litter under snowmobile trails was significant, but recovered. Some species of spring plants under snowmobile trails experienced up to 20 percent winter mortality, or no growth, delayed growth, or delayed or reduced flowering. Underground root structures were frozen and damaged in some instances. Species with large underground storage structures experienced the greatest damage due to freezing. Wanek (1974) also found that in an alfalfa field subjected to snow compaction by snowmobiles, productivity decreased by 24 - 33 percent. Weedy species also showed an accompanying increase. The decline in productivity was steeper during a more severe winter than during a milder winter. Wanek (1974; 1971) also found conifer sapling damage and mortality from snowmobile trails, particularly under low snow conditions. The damage to white spruce was highest. Some species, including trembling aspen and raspberry, increased in areas of snowmobile activity.

Bogs appear to be particularly sensitive to snowmobile activity. Wanek (1974) found a decline in some bog plants, with increasing snowmobile activity. Although sphagnum appeared to be unaffected, declines were observed in bog laurel, leather leaf, small cranberry, and pitcher plant. Impacts appeared to be due to mechanical damage, cold penetration, and desiccation.

Pesant et al. (1985) tested the effects of snowmobiling on agricultural fields. They found that in certain forage types, snowmobile trails resulted in reduced or delayed spring growth, changes in species composition, and reduced forage yield. Impacts were attributed to reduced soil temperatures under compacted snow, and deeper frost penetration into the soil, with accompanying damage to plants. Foresman et al. (1976) also found an early spring reduction in the growth of bluegrass under snowmobile trails, but found that vegetation had recovered by early summer. Matted vegetation under snowmobile tracks may have kept soil temperatures lower in the spring, and made it physically more difficult for new growth to penetrate the matted layer.

Keddy et al. (1979) found that snow compaction was greatest when snowmobiles traversed an area on several different days (increased frequency) than if they traversed the same area multiple times on the same day (increased intensity). Increased frequency of snowmobile use resulted in a decrease in standing crop on an old field, but no significant decrease occurred with greater intensity. Some shift in plant community structure also was noted. No significant impacts on vegetation were observed on an ice-covered marsh. Negative impacts of snowmobiling on vegetation may result from lower temperatures affecting buds and food storage structures, and longer snow retention in the spring may affect early germination and growth. Matting of vegetation may affect seed dispersal from previous year's seedpods.

Boucher and Tattar (1975) found that damage to vegetation and soils was greatest where snowmobile trails were located on steep (> 30 degrees) south-facing slopes. Damage primarily resulted from decreased snow depths (due to greater solar radiation), together with increased pressure of snowmobile treads on steeper slopes. On steep slopes, the surface organic layer, and in some instances the upper soil layer, were lost. Damage to plants included not only above-surface parts, but also damage to shallow root systems. Although vegetation recovered on flatter areas receiving moderate use, highly disturbed steep slopes did not.

Soil and Litter

The compaction of snow under snowmobile trails results in changes in thermal conduction and snow structure that cause snowmobile trails to melt more slowly in the spring and can create partially anaerobic conditions. The rates of litter decomposition may slow as a result. Neumann and Merriam (1972) found that the water holding capacity of snowmobile trails was significantly reduced. That could reduce the ability of the snow to hold water during spring run-off.

In contrast to this, Aasheim (1980) suggested that the delayed melting of compacted snowmobile trails might actually contribute to a reduction in peak run-off amounts.

Boucher and Tattar (1975) found that snowmobile activity on steep, south-facing slopes could disrupt or remove the surface layer of soil and increase erosion during spring rains. Some reports (Aasheim, 1980), indicate that soil erosion may be reduced on flatter areas under some circumstances because the compacted snow on snowmobile trails may protect against erosion from spring run-off.

There appears to be general agreement that snowmobile activity on steeper slopes can increase erosion, particularly with shallow snow depths and vegetation disturbance.

The impacts of snowmobiles on soils and vegetation under shallow snow conditions may be as significant as when snowmobiles travel on bare ground (Hammitt and Cole, 1998).

Foresman et al. (1976) found no evidence of soil compaction under snowmobile trails.

The anticipated impacts from snowmobiling include damage to vegetation from snowmobile activity during the winter and from brush clearing during the fall, and some potential for soil erosion. There are no known rare plants or plant communities along the present route of trail 18. Because much of trail 18 is on a pre-existing road, where soils have already been compacted and vegetation has been removed, additional damage to vegetation and erosion should be minimal. Although the majority of trails on the Maine side of the refuge are also on roads, we will need to evaluate all Maine trails and may re-route or close them to minimize impacts. The maintenance of the Mountain Pond Rd. for snowmobile use encourages traffic by wheeled vehicles during the summer; they frequently drive on the road when the road is wet, thus increasing the potential for erosion. Installing gates at both ends of the road to prevent entry of vehicles outside of the snowmobile season will avoid that impact.

Dogsledding

Impacts to habitats and animals from dogsledding are similar to snowmobiling for all subject headings up to this point, except for the following. Wildlife exhibit a strong physiological response to dogs and dogs accompanied by humans (Miller et. al. 2001, Sime 1999). Deposition of canine feces provides a potential disease vector for wildlife (Sime 1999). While these potential disturbances would be contrary to the establishing purposes of the refuge, they are mitigated in large part by the low volume of dogsledding on the refuge and the location of trails along existing trails outside of deer wintering areas. Dogs used for dogsledding are not free roaming and will therefore keep to the trails.

Pollution

Water Quality
Adams (1975) found high levels of hydrocarbons after ice-out in the water of a small (2.5 ac), shallow pond that had been experimentally exposed to snowmobile exhaust. Brook trout exposed to the pond water were shown to have incorporated exhaust components (hydrocarbons). Hydrocarbons increased from undetectable levels in the water, pre-treatment to 10 ppm, post-treatment. Exposed fish exhibited hydrocarbon levels of up to 1 ppm. Petroleum hydrocarbons can have pathological effects on fish at very low levels (<10 ppb) and may negatively impact reproduction and foraging (Adams, 1975). Hydrocarbon concentrations were highest near the water surface after ice-out. Fish may be particularly vulnerable to hydrocarbon contamination in the early spring because they may be in poorer condition, and are more likely to be active near the water surface. The concentration of hydrocarbons in snow is likely to be particularly high on trails where regular grooming constantly packs exposed snow (Oliff et al. 1999). Spring snowmelt may release those hydrocarbons into streams and other bodies of water (Oliff et al. 1999). To what extent the bodies of water on the refuge are at risk of hydrocarbon pollution is unclear, given current levels of snowmobile use, recent improvements in snowmobile technologies, and large water volumes.

Air Quality
Bishop et al. (2001) found that snowmobiles accounted for 27 percent of the annual emissions of carbon monoxide in Yellowstone National Park, as well as 77 percent of the annual hydrocarbon emissions. Carbon monoxide production was reduced by 13 percent for vehicles using oxygenated fuels, but hydrocarbon emissions were unaffected. Fan-cooled snowmobiles had lower hydrocarbon emissions than liquid cooled machines.

Although automobiles substantially out-number snowmobiles 16:1 in Yellowstone during the winter, snowmobiles are responsible for up to 90 percent of hydrocarbon and up to 69 percent of carbon monoxide emissions in the park (US GAO, 2000). Additionally, 25 percent to30 percent of snowmobile fuel is released unburned into the atmosphere (US GAO, 2000).

The anticipated impacts from snowmobiles include some exhaust emissions to the air and possibly refuge streams. The refuge currently has no data on stream or air quality. Only a few small streams are crossed by New Hampshire Trail 18 and with appropriately constructed bridges it is expected that water pollution impacts will not be significant. The refuge has surveyed for stream salamanders on some of the streams crossed by Trail 18, but has not detected any differences in salamander populations that could be reliably attributed to snowmobile-caused pollution. Trails on the Maine side of the Refuge will need to be assessed and evaluated for potential negative impacts. Some of these trails may be re-routed or closed, should conditions warrant.

Noise
Snowmobile noise is readily detectable by wildlife at distances up to several kilometers. The effects of disturbance on wildlife are quite variable, and many species seem to be capable of habituating to it (Bowles, 1995). There is no clear evidence for noise having an impact at the population level (Bowles, 1995). Noise may have an impact on the experience of other human users on the refuge.

We have not measured noise levels on the refuge, but they are probably significant near trails and on Umbagog Lake during busy winter weekends. Because of the ability of snowmobile noise to travel over great distances, much of the noise on the refuge probably comes from off-refuge snowmobile activity, over which the refuge has no control, as well as from on-refuge activity. We can minimize user conflicts among users by restricting snowmobile use to designated trails, thus leaving much of the remainder of the refuge open to other users.

Summary of Anticipated Impacts

Although the information available about the effects of snowmobiling on designated trails is incomplete, at its current and anticipated levels and patterns of use, we do not expect it to constitute significant short-term or long-term impacts separately or cumulatively. We will evaluate all trails every 5-years to ensure there are not site-specific impacts. We may re-route or close some trails if we determine that they have a significant, negative impact on wildlife or habitat.

Snowmobile trails are located almost entirely on existing gravel roads built to support commercial logging operations. The use of those roads as the location for the trails has effectively mitigated impacts of snowmobiling relating to soil and vegetation on those surfaces. The bridges and culverts crossing the water courses are designed to support trucks and other heavy equipment. Therefore, additional impacts from snowmobiling are unlikely. Snowmobile trails throughout the area have been established for many years and pre-date refuge ownership. Because the wildlife potentially affected are accustomed to that use, we consider impacts on wildlife minimal. Increases in emission regulations by the EPA, along with the increase in the number of 4-stroke and new cleaner 2-stroke engines in modern snowmobiles has and will continue to reduce the potential impacts on the environment described in the literature review. The increased presence of a law enforcement officer and zone officer will ensure stipulations that support the compatibility of this use. Therefore, snowmobiling and dogsledding on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. Our continued monitoring of the effects of snowmobiling is necessary to understand better their impacts on refuge habitats, plant and wildlife communities, and human visitors. Monitoring will identify any actions needed to respond to new information and correct problems that may arise in the future.

Snowmobile trails on the refuge provide an important link in the state trail system, enhance opportunities for the public to experience the winter landscape, and facilitate priority public uses. This will potentially benefit Goal 4 "Provide high quality wildlife dependent activities" of the CCP by providing opportunities during winter months for wildlife observation and photography and access for hunting. Opportunities also exist to interpret the refuge along the snowmobile trail system. Goal 6 of the CCP "Enhance the conservation…through partnerships…" will also benefit from this activity by establishing the refuge as a partner with State and community economic and conservation groups. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:

As part of the CCP process for LUNWR this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EA. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

DETERMINATION: THIS USE IS COMPATIBLE __X__
THIS USE IS NOT COMPATIBLE _____ (check one)

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

1. Snowmobiles and dogsleds will only be permitted on designated trails (map C-4).

2. Snowmobile trails will only be open for use when all areas of the trail have generally contiguous snow cover.

3. All trails will be located on existing roadbeds, wherever possible, to minimize vegetation damage. Trails will also be kept away from streams to avoid erosion. Where stream crossings are unavoidable, siting and construction of bridges or culverts will follow best management practices, and crossing structures will be maintained in good repair.

4. Trails will be located away from areas of unique or sensitive vegetation, such as bogs or wetlands.

5. Snowmobile trails will be located so that they are away from deer wintering areas and do not run between deer bedding and feeding areas. Trails will also be located in upland deciduous forest, and will be kept out of drainage bottoms and coniferous riparian areas important for wildlife such as fisher, marten, and moose, wherever possible.

6. All trails will be surveyed for signs of wildlife activity, sensitive vegetation, or erosion potential, and trail locations will be entered into a geographic information system. We will use that information to guide routing, re-routing, or closure of trails. Biological inventories will continue to provide baseline information for measuring change. Should the monitoring and evaluation of the use indicate that the compatibility criteria have or will be exceeded, appropriate action will be taken to ensure continued compatibility, including modifying or discontinuing the use.

7. The refuge will institute a public outreach program (brochures, signs) to help educate the public about refuge regulations, safety, and how to minimize disturbance of wildlife.

8. Routine law enforcement patrols will be conducted throughout the year to promote compliance with refuge regulations and provide educational outreach, help monitor public use patterns, public safety, and document visitor interactions. Refuge officers may record visitor numbers, vehicle numbers, visitor activities, and locations of the activities to document current and future levels of refuge use. Conditions that are a risk to public safety will be identified, and appropriate action will be promptly taken to correct such conditions.

JUSTIFICATION: This use has been determined to be compatible provided the stipulations necessary to ensure compatibility are implemented, and the use does not exceed thresholds necessary for visitor safety and resource protection. Snowmobiling on Lake Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul J Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
(Signature and Date)

Mandatory 10-year re-evaluation date: January 9, 2019

Literature Cited

Aasheim, R. 1980. Snowmobile impacts on the natural environment, *in*: Andrews, R. N.L. and P.F. Nowak, eds., Off-road vehicle use: a management challenge. USDA Office of Environmental Quality, Wash. D.D. 348 p.

Adams, E. S. 1975. Effects of lead and hydrocarbons from snowmobile exhaust on brook trout (*Salvelinus frontinalis*). Trans. Amer. fish. Soc. No. 2: 363-373

Bishop, G.A., J.A. Morris, and D.H. Stedman. 2001. Snowmobile contributions to mobile source emissions in Yellowstone National Park. Environ. Sci. & Tech. 35(14): 2874-2881.

Boucher, J. and T.A. Tattar. 1975. Snowmobile impact on vegetation. Forest Notes 121:27-28

Bowles, A. E. 1995. Responses of wildlife to noise, *In*: Wildlife and recreationists: coexistence through management and research. R.L. Knight and K.J. Gutzwiller, eds. Island Press, Wash. D.C. 372 p.

Colescott, J.H. and M. P. Gillingham. 1998. Reaction of moose (*Alces alces*) to snowmobile traffic in the Greys river valley, Wyoming. Alces 34(2):329-338.

Creel, S., J.E. Fox, A. Hardy, J. sands, B. Garrott, and R. O. Peterson. 2002 snowmobile activity and glucocorticoid stress responses in wolves and elk. conser. Biol. 16(3): 809-814.

Crete, M. and S. Lariviere. 2003. Estimating the costs of locomotion in snow for coyotes. Can. J. Zool. 81:1808-1814.

Davenport, M. A. and W. T. Borrie. 2005. The appropriateness of snowmobiling in national parks: an investigation of the meanings of snowmobiling experiences in Yellowstone National Park. Environ. Management 35(2):151-160.

Dorrance, M.J., P.J. Savage, and D.E. Huff. 1975. Effects of snowmobiles on white-tailed deer. J. Wildl. Manage. 39(3): 563-569.

Eckstein, R.G., T. F. O'Brien, O. J. Rongstad, and J. G. Bollinger. 1979. Snowmobile effects on movements of white-tailed deer: a case-study. Environ. Conserv. 6(1): 45-51.

Foresman, C.L., D.K. Ryerson, R.N. Walejko, W.H. Paulson, and J.W. Pendleton. 1976. Effect of snowmobile traffic on bluegrass (*Poa pratensis*). J. Environ. Qual. 5(2):129-133.

Freddy, D. J., W. M. Bronaugh and M. C. Fowler. 1986. Responses of mule deer to disturbance by persons afoot and snowmobiles. Wild. Soc. Bull. 14: 63-68.

Goodrich, J.M. and J. Berger. 1994. Winter recreation and hibernating black bears *Ursus americanus.* Biological Conserv. 67:105-110

Grey, P. 2005. Personal communication. New Hampshire Bureau of Trails.

Hammitt, W. E. and D.N. Cole. 1998. Wildland recreation: ecology and management. 2nd Ed. John Wiley & Sons, N.Y. 361 p.

Huff, D. E. and P.J. Savage. 1972. A correlation of deeer movements with snowmobile activity in Minnesota during winter. Proc. of the Midwest Fish & Wildlife Conf. 34:42.

Jarvinen, J.A. and W.D. Schmid. 1971. Snowmobile use and winter mortality of small mammals *in*: Proc. of the 1971 snowmobile and off the road vehicle research symposium. Tech. Rep. 8. Recreation Research and Planning Unit, Dept. of Park & Recreation Resources, Michigan State Univ., E. Lansing, MI. 196 p.

Keddy, P.A., A. J. Spavold, C.J. Keddy. 1979. Snowmobile impact on old field and marsh vegetation in Nova Scotia, Canada: an experimental study. Environ. Management. 3(5):409-415.

Knight, R. L. and D. N. Cole. 1995. Factors that influence wildlife responses to recreationists, *In*: Wildlife and recreationists: coexistence through management and research. R.L. Knight and K.J. Gutzwiller, eds. Island Press, Wash. D.C. 372 p.

Miller, S.G., R.L. Knight and C.K. Miller. 2001. Wildlife responses to pedestrians and dogs. Wildlife Society Bulletin, Vol. 29 No. 1. pp. 124-132.

Moen, A. N. 1976. Energy conservation by white-tailed deer in the winter. Ecol. 57:192-198.

Moen, A..N., S. Whittemore, and B. Buxton. 1982. effects of disturbance by snowmobiles on heart rate of captive white-tailed deer. NY Fish & Game J. 29(2): 176-183.
Neumann, P. W. and H.G. Merriam. 1972. Ecological effects of snowmobiles. Canad. field-Natur. 86: 207-212.

Ollif, T., K. Legg, and B. Kaeding, eds. 1999. Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment. Rept. to the Greater Yellowstone Coordinating Committee. Yellowstone National Park, WY. 315 p.

Pesant, A.R., C. Fernet, L. Belzile, and J.L. Dionne. 1985. Effects of snowmobile traffic on yield and botanical composition of forage stands in Quebec. Can. J. Plant Sci. 65:543-552.

Richens, V. B. and G. R. Lavigne. 1978. Response of white-tailed deer to snowmobiles and snowmobile trails in Maine. Canad. Field-Natur. 92(4):334-344.

Severinghaus, C.W., and B.F. Tullar. 1978. Wintering deer versus snowmobiles. NY Dept. Environ. Conserv.

Sime, C.A. 1999. Domestic dogs in wildlife habitats. Pgs. 8.1-8.17 in G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: A review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society. 307pp.

U. S. GAO. 2000. Report to congressional requesters: Federal lands: Agencies need to assess the impact of personal watercraft and snowmobile use. GAO/RCED-00-243. U.S. General Accounting Office, Wash. D.C. 85 p.

Wanek, W.J. 1971. Snowmobiling impact on vegetation, temperatures, and soil microbes, *in* : Proc. of the 1971 snowmobile and off the road vehicle research symposium. Tech. Rep.8. Recreation Research and Planning Unit, Dept. of Park & Recreation Resources, Michigan State Univ., E. Lansing, MI. 196 p.

Wanek, W.J. 1974. The ecological impact of snowmobiling in northern Minnesota, *in*: Proc. of the 1973 snowmobile and off the road vehicle research symposium. Tech. Rep.9. Recreation Research and Planning Unit, Dept. of Park & Recreation Resources, Michigan State Univ., E. Lansing, MI. 202 p.

White, P.J., T. Davis, and J. Borkowski. 2004. Wildlife responses to winter recreation in Yellowstone National Park, 2004 annual report. National Park Service.48 p.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Bicycling

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed? **First time use has been proposed.**	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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? **Public understanding and appreciation only.**	**X**	
(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?	**X**	

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 __X__ 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** __**X**__

Refuge Manager: Paul L Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Bicycling

Narrative

We are proposing to open the Refuge to bicycling to facilitate priority public uses. Current levels of this use are low and this use often occurs concurrently and without conflict with other public uses including priority public uses. This use would provide the public with an increased opportunity to participate in priority public uses. It is an alternate method of travel to view the refuge's resources and participate in allowable public uses.

COMPATIBILITY DETERMINATION

USE: Bicycling

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C. 3901 (b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4)]
4. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(b)(1)]

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." [16 U.S.C. 3901(b); Emergency Wetlands Resources Act of 1986]

2. "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds…" [6 U.S.C. 715d; Migratory Bird Conservation Act]

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…" [16 U.S.C. 742f(a)(4); Fish and Wildlife Act of 1956]

4. "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" [16 U.S.C. 742f(b)(1); Fish and Wildlife Act of 1956]

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
"The mission of the 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 bicycling. Bicycling when considered by itself is not a priority use of the National Wildlife Refuge System.

(b) Where would the use be conducted?
The use would be conducted on designated routes of travel open to public access throughout the refuge. Bicycles are considered vehicles and are therefore limited to the designated routes of travel

for motor vehicles and trails designated for bicycle use (currently, this includes the middle section of Mountain Pond Road). No other trail or off-road bicycling will be allowed. Please refer to Map C-1 for locations of designated routes of travel.

(c) When would the use be conducted?
This use will be conducted from the Wednesday before Memorial Day weekend through Fall.

(d) How would the use be conducted?
We are proposing to open the Refuge to bicycling to facilitate priority public uses. Current levels of this use are low and this use often occurs concurrently and without conflict with other public uses including priority public uses.

This use would provide the public with an increased opportunity to participate in priority public uses. It is an alternate method of travel to view the refuge's resources and participate in allowable public uses.

At the discretion of the Refuge Manager, some areas may be seasonally, temporarily, or permanently closed to bicycling if wildlife or habitat impacts, or if user conflicts become an issue.

(e) Why is the use being proposed?
The use is being proposed by the refuge to facilitate access to the refuge for the public to participate in priority public uses.

(f) Availability of Resources:
The resources necessary to provide and administer this use are available within current and anticipated refuge budgets. Staff time associated with the administration of this use is primarily related to answering general questions from the public and monitoring impacts of the use on refuge resources. This activity is administered by the refuge staff, who assess the interactions among user groups and any related user impacts. Resource impacts will be monitored by refuge staff, under the supervision of the refuge manager. The use of refuge staff to monitor the impacts of public uses on refuge resources, and visitors is required for administering all refuge public uses. Therefore, these responsibilities and related equipment are accounted for in budget and staffing plans.

Costs associated with bicycling are estimated below:

Routine maintenance:	$1,000	annually. This is the expected cost to maintain roads and signs due to impacts from bicycling.
Supplies and materials:	$200	This includes signage for brochures (produced inhouse).
Monitoring:	$500	annually.
Law Enforcement:	$1,000	annually for a Refuge Officer.
Total:	$2,700	

We do not anticipate charging fees.

Anticipated Impacts of the Use:
Access and use of the refuge for non-commercial bicycling on designated roads and trails poses a minimal threat of impact to the refuge achieving Goal 3 "Manage Upland Forest Habitats" as written in the CCP

Bicycle use can cause soil compaction and erosion, particularly when soils are wet, which can degrade plant communities. Soil compaction can diminish soil porosity, aeration, and nutrient availability. Bicycle tires could alter drainage features of roads and trails by increasing water channeling and erosion. These impacts will be minimized since bicycling will be allowed on designated routes of travel for motorized vehicles and multiple use trails. These designated routes of travel are along existing gravel roads which have been designed for heavier vehicle use. These roads will be monitored and maintained by refuge staff. Regular and corrective maintenance should address any impacts caused by bicycling.

Disturbance to wildlife from bicycle use is expected to be minimal and temporary from the mere presence of humans. Current levels of use are low and impacts of this disturbance are considered negligible. Refuge staff will monitor the levels of use over time.

No other refuge goals and objectives, as written in the CCP, will be affected by this use. No negative or cumulative long-term impacts are anticipated from allowing this use, however programs may be modified in the future to mitigate unforeseen impacts.

Public Review and Comment
As part of the CCP process for Lake Umbagog NWR this compatibility determination will undergo extensive public review, including a comment period of 30 days following the release of the Final Environmental Impact Statement.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

- A refuge officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.
- Access to the refuge by bicycle is limited to the designated routes of travel. No other trails, logging roads, skid trails or firebreaks are permissible.
- Providing outfitting or guided bicycle trips on the refuge requires a special use permit, issued by the refuge manager and considered case by case for impacts to wildlife, habitat and other uses or management activities.
- Outreach and signage will be used to orient potential bicyclists to appropriate areas.

Justification: Bicycling has been determined to be compatible provided the above stipulations are implemented. The use of bicycles to facilitate priority public uses is a reasonable mode of access on designated routes of travel. Monitoring would be conducted to ensure that this use remains compatible. If significant impacts are found, corrective actions would be taken to protect refuge resources. Recreational bicycling on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul L Casey 1-6-09
Signature and Date

Concurrence: Regional Chief: Anthony D Leger 1-9-09
Signature and Date

Mandatory 10-year Re-evaluation Date: January 9, 2019

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog 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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed? **First time use has been proposed.**	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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? **Public understanding and appreciation only.**	**X**	
(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?	**X**	

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 X 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** X

Refuge Manager: Paul L Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Horseback riding

Narrative

Horseback riding on designated trails on the refuge provides increased opportunity for public participation in priority public uses. It is an alternative method of travel to view the refuge's diverse natural resources. It is anticipated that horseback riding would facilitate wildlife observation, wildlife photography and interpretation.

COMPATIBILITY DETERMINATION

USE: Horseback riding.

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C.3901 (b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4)]
4. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(b)(1)]

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." [16 U.S.C. 3901(b); Emergency Wetlands Resources Act of 1986]

2. "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds…" [16 U.S.C. 715d; Migratory Bird Conservation Act]

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…" [16 U.S.C. 742f(a)(4); Fish and Wildlife Act of 1956]

4. "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" [16 U.S.C. 742f(b)(1); Fish and Wildlife Act of 1956]

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
"The mission of the 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 horseback riding to facilitate priority public uses on the Umbagog National Wildlife Refuge. Hunting, fishing, wildlife observation, photography, environmental education and interpretation are priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Horseback riding on designated trails on the refuge provides increased opportunity for public participation in priority

public uses. It is an alternative method of travel to view the refuge's diverse natural resources. It is anticipated that horseback riding would facilitate wildlife observation, wildlife photography and interpretation.

(b) Where would the use be conducted?
The refuge will allow travel on Mountain Pond Rd. and the snowmobile trail that connects the south end of Mountain Pond Rd. to Rt. 26 (see map C-1).

(c) When would the use be conducted?
The horseback riding trail would be open to horseback travel from May 15 through November 30.

(d) How would the use be conducted?
Horseback riding to facilitate priority public uses commonly involves observing natural features and animals from horseback. Riders stop frequently to observe associated plant communities and animals during their ride. Horseback riding for such purposes is done at a walking gait. Riding typically occurs either individually or in a small group of two to four riders. Horseback riding will be limited to the designated trail which has a packed gravel surface and the road can accommodate the safe passage of other users. The designated trail also has sufficient viewing distance for horseback riders to detect, in a timely fashion, other users and maneuver appropriately per rules of right-of-way.

Two gates will be installed: one on Mountain Pond Road south of Eames Road and the other on Mountain Pond Road north of the Potter Farm Road. The purpose of these gates is to only allow non-motorized use of the middle section of Mountain Pond Road except during the winter months when the gates will be opened for snowmobile trail use. These gates will be passable by horseback riders but not ATVs or other motor vehicles. No parking areas will be provided for horse trailers on the refuge.

Safety and information signs will be installed at refuge entry points and at appropriate sites were the designated trail intersects other roads and trails. Brochures depicting the trail will be available from the refuge office.

The trail designated for horseback riding will be, like all designated routes of travel, monitored at least annually to determine if they remain compatible with the allowable uses. Designated routes will be maintained in such a manner as is practical to minimize environmental impacts such as erosion and sedimentation and provide safe conditions for allowable travel.

A refuge law enforcement officer will routinely patrol the area and monitor the types and levels of use seen during patrols and make recommendations to avoid negative user interactions or correct potential safety concerns.

(e) Why is this use being proposed?
Horseback riding on the refuge provides an increased opportunity for the public to connect with nature and participate in priority public uses. Wildlife observation, wildlife photography, and environmental 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.

Availability of Resources:
With the hiring of a refuge law enforcement officer, and a zone officer, the resources necessary to provide and administer this use, at current use levels, is available within current and anticipated refuge budgets. Staff time associated with administration of this use is related to general oversight of trail maintenance activities, issuing special use permits and monitoring compliance with permit conditions, law enforcement, monitoring public use, and monitoring resource impacts.

The refuge manager will administer the program. A wildlife biologist will monitor effects on refuge resources. Visitor use will be monitored by the refuge law enforcement officer. A refuge law enforcement officer will conduct law enforcement activities to provide for visitor safety and resource protection.

Annual costs associated with the administration of horseback riding on the refuge are estimated below:

Overall Oversight of Program; Coordinate with States of NH and Maine:	$500	GS-13 Refuge Manager
Law enforcement–patrol/visitor-resource protection/ public use monitoring/enforcement/outreach:	$1,000	GS-7 Refuge Officer
Resource impacts/monitoring:	$1,000	GS-12 Wildlife Biologist, Deputy Refuge Manager
Trail Maintenance:	$1,000	
Signs:	$1,000	first year only
Total:	$4,500	in the first year
	$3,500	*thereafter*

Maintenance of the trails will be a combined effort between the refuge and snowmobile trail clubs (since the trails occur on snowmobile trails). Annual funding for maintenance listed above is for refuge maintenance only. See the snowmobiling compatibility determination for Umbagog NWR for snowmobile club responsibility. Law enforcement coverage on the refuge is occasionally supplemented by officers from New Hampshire Fish and Game and Maine Department of Inland Fisheries and Wildlife, at no cost to the refuge.

Anticipated Impacts of the Use:
Potential impacts of horseback travel include: soil compaction and erosion, downstream sedimentation, trampling and mortality of fragile plant communities, habitat loss/deterioration, wildlife disturbance, hydrologic changes, human health effects and a shift in plant communities along

trails. These potential impacts as reported in the literature and through in-field investigation and observation are listed below:

Impacts to plants: Horse travel can impact plants on trails by directly crushing them. Indirectly, horses can impact plants by compacting soils, which diminish soil porosity, aeration and nutrient availability (Kuss 1986). Hammitt and Cole (1998) noted that compaction limits the ability of plants to re-vegetate affected areas. Plants growing in wet or moist soils are the most sensitive to disturbance from trampling effects (Kuss 1986). Moist and wet soil conditions are common during spring and early summer and can occur on upland trails that have been incised and are channeling water.

Horse use may cause local impacts to plants and soils when confined (i.e. tied or tethered to a tree) since the horse could eat the bark, which could result in girdling of a tree or allow for insect invasion and subsequent damage. Localized soil compaction and subsequent soil erosion can also damage trees especially where roots are exposed.

It is anticipated that allowing this use will cause some vegetation loss on designated routes. Plant communities that occur on these routes are not rare or highly sensitive to disturbance based on available information. Erosion from horse hooves may increase root exposure, however it is anticipated that under current levels of use the incidence of this problem will be minor. Trails that have been found compatible for horse use are pre-existing routes that have been modified by vehicles or are still being used for vehicle access to the refuge.

Soil Impacts: Horses cause soil compaction, particularly when soils are wet which can directly affect plant growth and survival (Kuss 1986). Horseback riding has been found to cause braided trails in excessively muddy trail sections (Summer 1986). Weaver and Dale (1978) found horse use caused a greater loss of vegetation cover, wider and deeper trails, and greater soil compaction when compared to hiker use on meadow and forest trail conditions. Horses may cause trail erosion by loosening the soil and increasing soil particle detachment under both wet and dry trail conditions (Deluca et al 1998).

Kuss (1986) found that increasing moisture content of soils reduces the ability of the soil to support traffic. Summer (1986) recommended that horse trails be established on dry, well-drained sites.

It is anticipated that some soil erosion will occur as a result of horse hooves on soil surfaces. Soil compaction is likely to occur, however this is anticipated to be insignificant relative to the current soil conditions. Routes that have been found compatible for horse use include pre-existing roads open for vehicle use on the refuge and routes modified through grading and proper drainage located predominately on upland soils. Current levels of horse use of the designated routes are not expected to cause significant impacts to soils through compaction or erosion.

Invasive Species: Exposed soil and an abundance of sunlight along roads and trails provide ideal conditions for the establishment of invasive plant species. Invasive plant species may be transported into the refuge through the presence of exotic plant seeds in feed hay or horse manure.

The current known incidence of invasive plant species is relatively low on the refuge, however refuge staff are constantly monitoring for invasive plants. Japanese knotweed (*Polygonum cuspidatum*) and common reed (*Phragmites australis*) have been observed by refuge staff.

Based on current levels of use it is anticipated that no significant increases in invasive plant species will occur as a result of this use. The route proposed for horseback use is old logging roads that were planted with exotic grasses by logging companies. Therefore, increases resulting from horse use are anticipated to be relatively low.

Hydrologic Impacts: Roads and trails used for horseback travel can affect the hydrology of an area, primarily through alteration of drainage patterns. Bartgis and Berdine (1991) noted that roads and trails can divert water from their original drainage patterns in the Canaan Valley of West Virginia. This results in some drainages becoming dry while others accelerate erosion by being forced to carrying more water. Zeedyk (2002) documented many instances in the Canaan Valley of West Virginia where existing trails were channeling water away from historic wetlands and in some cases causing erosion and sedimentation of bog and other wetland communities.

It is anticipated that horse use could alter drainage features of trails through erosion and compaction. These changes are likely to be insignificant based on current levels of use and condition of proposed routes. The routes proposed for horse use are pre-existing gravel roads and snowmobile trails. No new routes will be created to accommodate this use. Routes found compatible for horseback riding do not appear to be significantly affecting the hydrology of refuge habitats.

Wildlife Impacts: Horseback travel can cause disturbances to wildlife using the refuge. Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year such activities occur. Whittaker and Knight (1998) noted that wildlife response can include attraction, habituation and avoidance.

Trails can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where "generalists" (American robins) were found near trails and "specialist" species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat and increase energy demands on affected wildlife (Knight and Cole 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in "wildland areas" can dramatically change the normal behavior of wildlife mostly through "unintentional harassment."

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Some uses, such as bird observation, are directly focused on

viewing certain wildlife species and can cause more significant impacts during breeding season and winter months.

The designated trail where horseback riding will be allowed has been consistently used for public access for a long period of time, possibly as long as 100 years. A biological assessment of the trail location revealed one osprey nest in close proximity to the proposed trail. Any affects of horseback riding on the trail will be evaluated over a 3-year period for potential negative impacts. A section of this trail may be re-routed if it is determined that they have a significant negative impact on wildlife and/ or habitat.

Impacts to wildlife may be indirectly caused through erosion and subsequent sedimentation of streams and vernal pools. Increased sediment loads can reduce aquatic vegetation and dissolved oxygen concentrations (Sadoway 1986). Sedimentation can directly kill aquatic invertebrates ~~in~~ which impacts the success of amphibian larvae and adults (Sadoway 1986). Observations by refuge staff in 2002 document numerous occurrences of amphibian egg masses that failed after becoming coated in sediment from eroding trails and roads nearby.

Anticipated impacts of horseback riding on wildlife include temporal disturbances to species using habitat on the trail or directly adjacent to the trail. These disturbances are likely to be short term and infrequent based on current levels of use. Use of some trails may cause direct impacts such as mortality (crushing amphibians foraging on grassy trails) to nest abandonment of bird species nesting on trails. Long-term impacts may include certain wildlife species avoiding trail corridors as a result of this use over time. Routes found compatible for horse use are located primarily in continuous tracts northern hardwood forest on the refuge. Smaller more sensitive wildlife habitat such as riparian, wetland and grassland areas were avoided. Based on existing levels of use horseback riding is not anticipated to significantly increase wildlife habitat fragmentation or cause significant impacts through disturbance.

User Conflicts

Conflicts between trail users are commonly reported in the literature (Knight and Gutzwiller 1995, Ramthun 1995, Watson et. al 1994, Chavez et al. 1993). Conflicts range from concerns over personal safety to certain user groups feeling that they should be given priority over other groups based on a past history or other reasons. Based on interviews with individuals and user groups, conflicts between groups are not significant in this area. This is likely due to the relatively low number of users in the area, as compared with heavy use and conflict sites reported in the literature. Providing safe routes for wildlife-oriented activities is an important consideration for wildlife observation trails on the refuge. Safety considerations include ability of multiple modes of access to use a trail without creating dangerous conditions, ability to maintain a trail to allow safe use, and timing of various uses such as wildlife observation and hunting activities. Horseback travel on the subject routes are considered safe under current conditions and levels of use.

Summary:

Any effects of horseback travel on the roads designated, are not, based on our current levels of knowledge, and at current and anticipated levels and patterns of use, considered separately or cumulatively, to constitute significant short-term or long-term impacts. The use is viewed as an effective and justifiable method of access that better enables the public to discover, experience, and

enjoy priority public uses on the refuge. Continued monitoring of the effects of horseback travel and associated human activities is necessary to better understand the influence of the use on refuge habitats, plant and wildlife communities, and visitors. Monitoring will identify any actions needed to respond to new information (adaptive management) and correct problems that may arise in the future. Therefore, horseback riding on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP.

Horseback riding to facilitate wildlife observation and photography and environmental interpretation can produce positive impacts to the wildlife resource. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of the wildlife and habitats associated with northern New England ecosystems. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System and the Service. This will benefit Goal 4 "Provide high quality wildlife dependent activities" of the CCP by providing opportunities for wildlife observation and photography and access for hunting. Opportunities also exist to interpret the refuge (Goal 5 of the CCP) along the trail. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:
As part of the CCP process for Lake Umbagog NWR this compatibility determination will undergo extensive public review, including a comment period of 30 days following the release of the Final Environmental Impact Statement.

Determination (check one below):

____ Use is Not Compatible

__X__ Use is Compatible with the following stipulations

Stipulations Necessary to Ensure Compatibility:

- Horseback travel to facilitate priority public use is only compatible on the designated trail and described in this compatibility determination and shown in Figure~~s~~ 1.
- Signs necessary for visitor information, safety, and traffic control will be installed.
- The refuge will conduct an outreach program to promote public awareness and compliance with refuge public use regulations.
- Horseback travel is allowed between sunrise and sunset.
- Camping and overnight parking are prohibited.
- Horses will not be tied to trees or confined on the refuge and must be accompanied by riders at all times.

- All routes designated for public access will be inspected at least annually for maintenance needs. Road and trail conditions that require immediate maintenance will be identified and appropriate action will be taken to correct such conditions. Prompt action will be taken to correct any conditions that risk public safety.

- Routine law enforcement patrols will be conducted throughout the year. The patrols will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Conditions that have the potential to risk public safety will be identified and appropriate action will be promptly taken to correct such conditions.

JUSTIFICATION:
This use has been determined to be compatible provided the stipulations necessary to ensure compatibility are implemented, and the use does not exceed thresholds necessary for visitor safety and resource protection.

Public use areas would be monitored at various times of the year to assess wildlife disturbance. We would include information about proper etiquette and the effects of human impacts on habitat and wildlife resources in refuge publications and flyers. Periodic law enforcement would ensure compliance with regulations and area closures, and would discourage vandalism.

Horseback riding on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul F Cary 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D Léger 1-9-09
(Signature and Date)

Mandatory 10-year Reevaluation Date: January 9, 2019

ATTACHMENTS:

Map C-1: Map showing the designated horseback riding trail.

CITATIONS

Bartgis, Rodney and A. Berdine. 1991. A preliminary assessment of biological resources in the Canaan Valley of West Virginia. Report to the Nature Conservancy. 20 pp.

Chavez, D.J, P.L. Winter, J.M. Baas. 1993. Recreational mountain biking: a management perspective. Journal of Park and Recreation Administration. 11(3): 29-36.

Deluca, T.H., Patterson, W.A., Freimund, W.A. and Cole, D.N. 1998. Influence of llamas, horses and hikers on soil erosion from established recreation trails in western Montana, USA. Environmental Management. V22, No.2:255-262.

Hammitt, William E. and Cole, David N. 1998. Wildland Recreation. John Wiley & Sons, New York, 361pp.

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

Knight, R.L. and K. J. Gutzwiller. 1995. Wildlife and Recreationists: Coexistence through management and research. Island Press, Washington, D.C. 371 pp.

Kuss, Fred, R. 1986. A review of major factors influencing plant responses to recreation impacts. Environmental Management, 10:638-650.

Miller, S.G., R.L. Knight, and C.K. Miller. 2001. Wildlife responses to pedestrians and dogs. Wildlife Society Bulletin, 29(1): 124-132.

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

Sadoway, K.L. 1986. Effects of intensive forest management on amphibians and reptiles of Vancouver Island: problem analysis. Research, B.C. Ministries of Environment and Forests. IWIFR-23. Victoria, B.C.

Summer, Rebecca. 1986. Geomorphic impacts of horse traffic on montane landforms. Journal of Soil and Water Conservation, 41:126-128.

Trails and Wildlife Task Force. 1998. Planning trails with wildlife in mind: A handbook for trail planners. Colorado State Parks, Denver Co. 51pp.

Watson, A.E., M.J. Niccolucci and D.R. Williams. 1994. The nature of conflict between hikers and recreational stock users in the John Muir Wilderness. Journal of Leisure Research, 26(4): 372-385.

Weaver, T. and Dale, D. 1978. Trampling effects of hikers, motorcycles and horses in meadows and forests. Journal of Applied Ecology, 15:451-457.

Whittaker, D. and Knight, R. 1998. Understanding wildlife responses to humans. Wildlife Society Bulletin, 26(3): 312-317.

Zeedyk, Bill. 2002. Summary Report of Road Related Wetlands Impacts of the Canaan Valley NWR. 5 pp.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Camping

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document? **Establishing EA**	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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. **(See Compatibility Determination for Justification).**

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

Not Appropriate_____ **Appropriate** X

Refuge Manager: Paul T Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

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Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Camping

Narrative

Before the creation of the Refuge in 1992, more than 20 campsites were located around Umbagog Lake. Most of these were leased year-to-year from private timber companies by Jim and Carolyn Willard, who managed them as part of a campground business (the Umbagog Lake Campground). Over the years, the industrial timberland around the lake changed hands. The new timber owners, including James River Co., Crown Vantage, Mead Paper Co. and Boise Cascade, generally renewed the lease agreements. The campground business included remote sites on the lakeshore and islands accessible only by boat, as well as a larger, multi-site base campground, accessible by car, on the south end of Umbagog Lake.

Starting in 1995, we began to acquire parcels on which some of those remote campsites were located. First, we acquired two islands with campsites in Leonard Pond, and a third in Thurston Cove from James River Co. We agreed to allow camping to continue at those sites, under the conditions specified in a special use permit issued to the Willards. In 1999, the State of New Hampshire bought the campground at the south end of Umbagog Lake and incorporated it into Umbagog State Park. The state continues to manage the facility as a state campground. In the spirit of the original Umbagog conservation partnership between the Service and both states, we agreed to maintain the existing level of camping on Umbagog Lake, by allowing camping to continue at remote sites on refuge lands.

Camping on the Refuge is a long-standing, popular use that pre-dates the creation of the refuge. Camping increases opportunities for the public to participate in priority public uses in a remote setting. Because many species of wildlife are most active at dawn and dusk, camping particularly facilitates wildlife observation, photography, hunting, and fishing. Visitors camping at remote sites enjoy the unique experience of hearing loon calls throughout the night during the breeding season.

COMPATIBILITY DETERMINATION

USE: Camping

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 (16 U.S.C 3901 (b))
2. Migratory Bird Conservation Act (16 U.S.C. 715d)
3. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))
4. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

PURPOSE(S) FOR WHICH ESTABLISHED:

1. …the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions... 16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986)

2. …for use as an inviolate sanctuary, or for any other management purpose, for migratory birds... 16 U.S.C. 715d (Migratory Bird Conservation Act)

3. …for the development, advancement, management, conservation, and protection of fish and wildlife resources… 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956)

4. …for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude… 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
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 overnight camping on refuge lands. Camping 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), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

Camping is a secondary use that facilitates and supports wildlife-dependent priority public uses including fishing, hunting, wildlife observation, and photography. Thirteen designated public campsites lie entirely on refuge-owned property. One additional campsite is located on the New

Hampshire-Maine border and is partially on refuge-owned land and partially on State of New Hampshire-owned land. The total is 14 campsites.

History of Camping on Umbagog Lake
Before the creation of the Refuge in 1992, more than 20 campsites were located around Umbagog Lake. Most of these were leased year-to-yearfrom private timber companies by Jim and Carolyn Willard, who managed them as part of a campground business (the Umbagog Lake Campground). Over the years, the industrial timberland around the lake changed hands.
The new timber owners, including James River Co., Crown Vantage, Mead Paper Co. and Boise Cascade, generally renewed the lease agreements. The campground business included remote sites on the lakeshore and islands accessible only by boat, as well as a larger, multi-site base campground, accessible by car, on the south end of Umbagog Lake.

The Willards eventually purchased the 9.6 acre multi-site base facility on the south end of the lake from Crown Vantage, but continued to lease the remote campsites. The Willards also held an agreement with the Society for the Protection of New Hampshire Forests to maintain several remote campsites on Big Island, which the Society owned. The majority of the campsites were located on the New Hampshire side of Umbagog Lake, but a number were located on the Maine side, as well. The Umbagog Lake Campground is generally opened for the season on the first Friday of the Memorial Day weekend, and closes on or around September 15.

Starting in 1995, we began to acquire parcels on which some of those remote campsites were located. First, we acquired two islands with campsites in Leonard Pond, and a third in Thurston Cove from James River Co. We agreed to allow camping to continue at those sites, under the conditions specified in a special use permit issued to the Willards. In 1999, the State of New Hampshire bought the campground at the south end of Umbagog Lake and incorporated it into Umbagog State Park. The state continues to manage the facility as a state campground. In the spirit of the original Umbagog conservation partnership between the Service and both states, we agreed to maintain the existing level of camping on Umbagog Lake, by allowing camping to continue at remote sites on refuge lands.

In addition to those campsites that are part of Umbagog State Park, Mollidgewock State Park manages several additional campsites along the Magalloway and Androscoggin Rivers. In 2001, the Service acquired lands that included two of those campsites. Both are drive-in campsites, easily accessible from Route 16. One, (North 2) is located next to the Magalloway River; the other, (North 1), is on the Androscoggin River. The base facility of Mollidgewock State Park Campground is located on the Androscoggin River, 3 miles south of Errol, New Hampshire. Both campsites on Refuge land are now designated as group campsites. An additional Mollidgewock campsite, (North 3), is located off-refuge on private land, near North 2. To summarize, Umbagog State Park manages 12 of the 14 campsites on refuge lands, and Mollidgewock State Park manages two campsites (see map C-1).

Umbagog State Park currently manages 34 remote campsites around the lake, in addition to providing electrical and water hook-ups at 35 sites and 3 cabins at the base facility at the southern end of the lake (see Appendix 1). In addition to the 12 remote sites wholly or partly on refuge land, six sites are located on Big Island, owned by Society for the Protection of New Hampshire Forests, and 16 sites are located on land owned by the State of New Hampshire (see map C-1). The park at the south

end of the lake provides motorized and non-motorized boat rentals, boat fuel, a boat launch, and transportation to the remote campsites.

(b) Where would the use be conducted?
We will continue to conduct the use at the 12 remote campsites managed by Umbagog State Park: R3, R13, R14, R15, R16, R18, R21, R22, R23, R28, R29, and R35. We may close or relocate those sites seasonally or permanently, at the discretion of the refuge manager, to protect refuge resources. We will close all campsites accessible by car, including campsites North 1 and North 2, now managed by Mollidgewock State Park (see map C-1).

(c) When would the use be conducted?
The refuge will be open to camping during the period set annually by the State of New Hampshire, but no earlier than May 20, and no later than October 15th. At other times of the year, the refuge will be closed for camping. The periods when we close coincide with state closure periods. In some years, we may close certain campsites seasonally to protect such nesting birds as loons, osprey, bald eagles, and waterfowl, as well as for the purpose of research or for other reasons to protect resources. Closures to protect nesting birds generally occur between late May and early July, but may occur outside that period for birds attempting to re-establish nests.

(d) How would the use be conducted?
The State of New Hampshire and the refuge will cooperatively manage campsites. The State of New Hampshire Division of Parks and Recreation will be responsible for campsite reservations and routine site maintenance, and will assist with providing camping information and law enforcement, where appropriate. The refuge will cooperate with the state in improving campsites, where appropriate.

A number of boat launches both on and off Refuge lands provide boat access to the lake and remote campsites. Our compatibility determination for fishing describes boat access points. Map C-1 shows their locations. Camping will be permitted only at State designated sites. Although we may close or move campsites to protect refuge resources, we will maintain a level of camping on the lake consistent with current levels.

The state provides each remote campsite with a fireplace, picnic table, and pit toilet. When a pit toilets is full, the state fills in the pit and moves the toilet to a new pit. Drinking water is not provided. No trash pick-up is provided and campers must carry out all trash. Existing State campsite regulations follow:

- The maximum number of tents allowed per site is two, with the exception of group campsites.
- The maximum number of tents at group campsites is eight.
- The maximum length of stay of 14 nights.
- The maximum number of people per campsite is 6, except at designated group sites.
- The maximum number of people at group campsites is 16.

- Sites R2, R6, R15, R18, R23, R27, and R31 are designated as group campsites.
- Quiet hours are from 10:00 pm to 7:00 am.
- Pets are permitted, but must be supervised.
- Fires are permitted but must be kept within the fire ring provided. Wood should be under 16 inches in length and less than 5 inches in diameter. Unattended fires are not permitted.
- Firewood must be brought in to island campsites. Elsewhere, firewood gathering is currently permitted.
- R15, R18, and R31 are the group campsites on refuge land.

In cooperation with the State of New Hampshire, we intend to modify some of the regulations as follows:

- Pets are allowed at the main camp base only, no pets are allowed on remote campsites.
- No firewood gathering will be permitted on refuge lands. Campers must bring in all firewood.

We list additional refuge-specific regulations below under the section "Stipulations Necessary to Ensure Compatibility".

(e) Why is this use being proposed?
Camping on the Refuge is a long-standing, popular use that pre-dates the creation of the refuge. Camping increases opportunities for the public to participate in priority public uses in a remote setting. Because many species of wildlife are most active at dawn and dusk, camping particularly facilitates wildlife observation, photography, hunting, and fishing. Visitors camping at remote sites enjoy the unique experience of hearing loon calls throughout the night during the breeding season.

Availability Of Resources:
Although camping is an ongoing use, we anticipate no expansion. Additional costs to administer the program should be minimal, because the State of New Hampshire now manages all campsite reservations and most campground maintenance. The resources for hiring a refuge officer to administer this use are available within current budget levels. FY2005 funds paid for a new car-top boat launch now under construction on the Magalloway River to help provide access to campsites. Staff time associated with administration of this use primarily relates to coordinating management of the program with the State of New Hampshire, assisting with some campsite restoration activities (usually accomplished through our annual Youth Conservation Corps program), providing law enforcement and outreach, and posting area closures near campsites to protect nesting wildlife

Costs associated with administering the program include:

Administration and coordination with State of New Hampshire:	$1,000	
Maintenance and campsite restoration (includes closure of illegal campsites, posting signs, vegetation restoration, closure of nesting areas, boat operation):	$5,000	(includes $4000 one time expenditure for signs; ongoing maintenance costs for signs: *$500–$1000/yr*)
Law Enforcement and Outreach:	$3,000	
Campsite Monitoring:	$1,000	
Total Cost of Program:	$10,000	year one
	$6,000	*subsequent years*

Anticipated Impacts Of The Use:
Of the 12 campsites that we intend to keep open, five are located in lakeshore pine-hemlock habitat, five are in mixed conifer-hardwoods, and two are in balsam fir-floodplain forest. Four sites are on islands; the rest are on the mainland. All sites are accessible only by boat.

Illegal camping at non-designated sites also occurs regularly along the Magalloway River, Harper's Meadow, in the Leonard Pond area, and elsewhere.

Sites 28 and 29 are both located on islands in Leonard Pond. Site 29 is approximately 400 meters from a traditional bald eagle nest tree and site 28 is approximately 500 meters from the nest tree. Two loon territories are also near these campsites, and nests are sometimes within 400 meters of one or both of the sites. Refuge sites 3, 14, and 15 are also within loon territories, and nest sites have been found within 250 meters of campsites. The State designates R15 as a group site.

The Refuge currently cordons off an area around the Leonard Pond eagle's nest with ropes and signs to prevent visitors from approaching within 200 meters from May to September. Although the pair of eagles that nested at the site for many years was habituated to human disturbance, a new pair that replaced it appears to be more sensitive. We will continue to monitor the impacts of human activity on the new eagle pair will continue to be monitored. If necessary, we may adjust the size of the eagle closure area and/or seasonally close or move campsites 29 and 28.

In cooperation with the State of New Hampshire, we also close areas seasonally around vulnerable loon nests on the lake to the public, as the refuge manager deems appropriate. Those closures help ensure that visitors remain far enough away from nests to avoid disturbance. Occasionally, visitors do ignore closure signs, either inadvertently or deliberately, resulting in disturbance to nesting birds. Adding a refuge officer will provide greater opportunity for enforcement and public outreach on this issue.

The refuge also coordinates with the State of New Hampshire in closing campsites seasonally near loon nests with a history of disturbance, both on and off refuge-owned lands. Refuge campsites we have closed in the past include: 14 and 15 (Sunday Cove). State campsites include: 4 (Big Island), 8 (Tidswell Pt.), 30 (Black Island Cove), and 38 (Sargent Cove Point). Seasonal closures generally last

until the eggs hatch or the nest fails, generally from mid-May- early July.
We describe below the potential impacts of camping, as reported in the literature. Impacts may be locally quite severe, but are usually restricted to a relatively small area: i.e. the campsite itself (Marion and Cole, 1996). Significant impacts on vegetation and soil generally occur quickly, even with light use (Cole, 1981). Much of the impact occurs when the campsite is first opened and during the first year of use. Recovery of closed campsites is generally a much slower process. Even on fertile soils, full recovery may take over 6 years in some areas (Cole and Marion, 1988; Marion and Cole, 1996). For that reason, Cole (1981) recommends against dispersed camping and rotational closure of campgrounds.

Soil: Camping results in soil compaction and reduction in soil moisture content. It may reduce or remove the organic litter and soil layer, and run-off and soil erosion may increase. Those changes affect soil invertebrates and microbial processes, as well as inhibit plant growth. Fine-textured soils are particularly susceptible to compaction. Campsites with vegetated shorelines that are accessed by boat may also undergo shoreline erosion from the effects of repeated boat landings compacting soil and removing vegetation. Visitor use of the shoreline for swimming, dish washing, and collecting water may also trample vegetation, compact soil, and accelerate erosion. That erosion may expose tree roots, resulting in increased tree mortality due to wind throw. Existing picnic tables and fire rings tend to concentrate the use of campsites and limit campsite expansion. The refuge will work with the State to evaluate the condition of the campsites. If necessary, we will harden campsites and the shoreline, provide signage, and educate visitors about low-impact camping techniques.

Vegetation: The impacts of camping on vegetation are usually locally severe even, with low to moderate use; they include loss of ground vegetation cover, reduced vegetation height and vigor, loss of rare or fragile species, and changes in plant community composition (Leung and Marion, 2000). Vegetation may be removed or trampled. Shrubs and trees are commonly lost from the site or damaged. Axes or fire may scar tree trunk, branches may be broken, bark removed or damaged, or nails placed in trees. Tree regeneration (seedlings and saplings) is generally lost, thus facilitating conversion to a non-forested site. Marion and Cole (1996) found on campsites they studied in Delaware that an average of 19 percent of trees had been felled and 77% of the standing trees had been damaged (primarily branches cut for firewood or trunks scarred by axes and nails). Trampling resistant vegetation (often grasses or exotics) tend to replace existing understory vegetation (forbs) (Marion and Cole, 1996).

The indirect effects of vegetation disturbance include microclimate changes and increased erosion. The extent of camping impacts on vegetation is generally related to the frequency sites are used, their durability, and group size (Cole, 1995). Larger groups are usually responsible for enlarging campsites more than small groups (Cole, 1992; Marion, 2003). Campsite enlargement is particularly a problem when campsites are located on flat, open sites. Campers may also enlarge the affected area by developing multiple, uncontrolled “social trails” between tents, to water sources, to view points or favored fishing locations. Some visitors have a much greater impact on vegetation than others, because they are more likely to cut down vegetation, dig trenches around tents, and otherwise modify the sites.

Cole (1981) suggests that lakeshore areas are not necessarily more fragile than areas at some distance from the shore. Although vegetation on moist and steep lakeshore soils may be more vulnerable to

damage, some lakeshore areas may actually be rocky or gravelly and flat, and thus fairly resistant to disturbance. Many of the campsites on Umbagog Lake have rocky shorelines and fall into this category. Over-used, poorly maintained campsites can have an esthetic impact that may impair visitor experience.

Camping is permitted only at designated campsites, so the disturbance of vegetation is limited to a relatively small area of the refuge. We are also planning to close permanently two car-camping sites along the Magalloway and Androscoggin Rivers, thus reducing the total number of campsites available. Drive-in sites are probably particularly vulnerable to campsite expansion. The State of New Hampshire regularly maintains remote campsites, and provides them with a picnic table and fire ring that tends to concentrate use and inhibit expansion. In cooperation with the state, we will evaluate all campsites and, if necessary, take additional measures to reduce social trails, identify designated tent sites, and provide outreach on low impact camping. Because wood gathering often damages vegetation, visitors will be required to provide their own wood at all refuge campsites. Digging or trenching will not be permitted at refuge campsites.

Campfires: The impacts of camping generally are much greater where campfires are permitted. Campfires can have severe effects on soils in a localized area. Campfires destroy organic matter in soil, and can change soil chemistry to a point that effectively "sterilizes" the site. Those effects can persist over a long period and make regrowth of vegetation difficult. In some cases, recovery may take over 10 years (Hammitt and Cole, 1998). Fire may directly damage trees and shrubs. Although forest fires in this area are unlikely, they are also a possibility. In addition, wood-gathering may result in tree damage from broken or cut limbs, axe scars, or felling. The collection of downed wood may increase the trampling of surrounding vegetation and reduce the amount of downed wood. This may affect communities of small mammal and terrestrial amphibian. Campers may develop multiple fire sites, which tend to contribute to campsite expansion. Fire pits often become receptacles for trash. Build-up of trash and charcoal may negatively affect the experience of subsequent campers. Illegal campsites and fires exacerbate those impacts.

All campsites are provided with a fire ring that helps to limit campfire impacts to a small area. Firewood has been depleted at all refuge campsites. The collection of firewood at refuge island sites is already banned. Because of the depletion of firewood, visitors will be required to bring their own wood supply, to further reduce damage to existing vegetation. That requirement applies to all refuge campsites. In cooperation with the State of New Hampshire, the refuge will provide increased outreach on low-impact camping and how to minimize campfire impacts and litter.

Water Quality: Improperly disposed human waste and pet waste at campsites may compromise water quality by introducing pathogens, and affect campsite esthetics. Human waste, food disposal, and dishwashing may increase aquatic nutrient loads. That may result in limited, localized increases in algal growth, facilitating oxygen depletion, and altering the composition of aquatic vegetation and invertebrate communities. Run-off from eroded campsites can increase turbidity and sedimentation, which may affect fish and invertebrates (Marion, 2003; Leung and Marion, 2000). Improperly cleaned motor boats may introduce invasive aquatic plant species from other water bodies. Soap from improper dishwashing, trash, and fish-cleaning waste, may all pollute water and have an esthetic impact. Pit toilets located near water on shallow, permeable soils can sometimes introduce coliform bacteria into the water (Hammitt and Cole, 1998). However, camping generally does not affect water quality to the

extent of creating a public health concern, even in areas that receive heavy use (Cole, 1981). The New Hampshire Division of Parks and Recreation will be responsible for maintaining campsites and campsite toilets. The refuge will cooperate with the state in providing educational outreach on invasive plants and proper waste disposal.

Wildlife: Camping can alter or destroy wildlife habitat, or displace wildlife from preferred habitat or resources (food, water, nest sites). Camping may also modify or disrupt wildlife behavior. Larger groups are generally more likely to disturb wildlife (Marion, 2003). Nesting birds such as eagles or loons may leave the nest in response to disturbance, exposing eggs to cooling or predators.

Human visitors or their pets may "harass" wildlife. Even leashed pets may disturb wildlife. Pets may also transmit diseases to wildlife (Hammitt and Cole, 1998). The disturbance of camping may also affect wildlife health, fitness, reproduction, and mortality rates (Leung and Marion, 2000).

Indirect effects may include a change in vertebrate species composition near the campsite. Changes in vertebrate communities at campgrounds (as compared to control sites) have been reported for birds (Blakesley and Reese, 1988; Garton et al. 1977; Foin et al. 1977; Knight and Gutzwiller, 1995) and small mammals (Clevenger and Workman , 1977). In the case of songbirds, changes in species composition were due primarily to a reduction in ground cover vegetation (for nesting, feeding) at campsites and different levels of sensitivity to human disturbance. Rarer species are generally absent from campgrounds.

The presence of humans attracts some species, while others avoid it. The availability of food generally differs between campgrounds and undisturbed areas. Natural foods may decrease in availability while foods supplied by humans may increase. Human may intentionally supply foods to wildlife, or unintentionally, because of littering, accidental spillage, or improper food storage (Garton et al. 1977). Human foods may be unhealthy for wildlife or promote scavenging behavior, which may increase vulnerability of animals to predation. Rodent populations often increase at campsites, in response to increased availability of human food, and may negatively affect nesting songbirds. Populations may crash when campsites are closed for the season (Marion, 2003). Bears and other scavengers may be attracted to improperly stored food and may damage property or threaten visitor safety. In at least one instance, a bear looking for food damaged a kayak at an Umbagog campsite.

We intend to continue to evaluate campsites annually and, in cooperation with the State of New Hampshire, seasonally close some campsites and nesting areas, if warranted. At the discretion of the refuge manager, we may close or relocate campsites permanently, should wildlife disturbance become a major concern.. We expect seasonal closures to minimize any camping disturbance of nesting birds. No pets will be permitted at Refuge campsites. The refuge will work with the State of New Hampshire on managing campsites and providing outreach to the public on how to avoid disturbing wildlife and the importance of not feeding wildlife and storing food properly.

Visitor Conflicts: Conflicts may arise between visitors as a result of noise and over-crowding. Conflicts may also develop between small and large groups and different user groups (fishermen, hunters, wildlife photographers, etc.). Litter, noise, large group sizes, and crowding may impair the

refuge experience for some visitors. Campsites are currently well spaced and group size is limited, so that conflicts do not appear to be significant at this time. Public outreach may help reduce potential conflicts by reducing littering and promoting considerate camping. The refuge will work with the State of New Hampshire to adjust camping policies, should this issue become significant.

Summary of Impacts: Camping on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP since the overall area impacted by the campsites is confined to a fairly small area, seasonal closures limit disturbance to nesting wildlife, and the sites have been used for many years.

Camping benefits Goal 4 "Provide high quality wildlife dependent activities" of the CCP by providing enhanced opportunities for hunting, fishing, wildlife observation and photography. Opportunities also exist to interpret the refuge at camp sites and through the reservation system benefitting Goal 5 of the CCP. Goal 6 of the CCP "Enhance the conservation…through partnerships…" will also benefit from this activity by continuing our partnership with the State of New Hampshire Department of Parks. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:
As part of the comprehensive conservation planning process for the Lake Umbagog refuge, this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

___ Use is Not Compatible

_X_ Use is Compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Camping will be at state-designated campsites only.
- The refuge will be open to camping during the period set annually by the State of New Hampshire, but no earlier than May 20th or later than October 15th
- Pets are not permitted on refuge campsites.
- Hunting dogs will be allowed on refuge campsites during the refuge hunting seasons only. All hunting dogs will be under the immediate and direct control of the hunter at all times while camping.
- No wood gathering or vegetation removal is permitted on the refuge.

- Campfires must be confined to the designated fire pit.
- No digging or trenching will be permitted.
- Feeding of wildlife is not permitted.
- All trash must be carried out.
- In cooperation with the state, we will implement best management practices for preventing campsite expansion.
- We will place signs at all Refuge campsites explaining refuge regulations and minimal impact camping techniques. The refuge will work with the state to provide additional outreach on "leave no trace" camping.
- We will monitor the impacts of camping, the condition of the shoreline and campsites, and the potential for wildlife disturbance yearly, and work with the state to minimize impacts or restore sites. We will prioritize for initial monitoring the sites with the highest potential for wildlife disturbance. Based on the outcome of those surveys, we may adjust our management of those sites.
- We will develop a cooperative camping management plan in conjunction with the state.

Justification:
Camping on the refuge is a popular use that pre-dates the creation of the refuge. Camping provides an increased opportunity for the public to participate in priority public uses in a remote setting. Because many species of wildlife are most active at dawn and dusk, and concentrate in areas accessible only by boat, camping facilitates wildlife observation, hunting, photography and fishing, in a safe manner. Providing the public with an opportunity to experience the refuge wildlife and natural resources through camping, along with a public educational outreach program, will help motivate visitors to understand and develop a commitment to protecting healthy ecosystems. Experiencing the refuge through camping and education are tools that can help build a land ethic, develop political support, and lessen vandalism, littering and poaching. We expect the impacts of camping on vegetation and wildlife to be minor and localized. With the stipulations noted above, camping will be compatible with refuge purposes.

Based on the limited detrimental impacts of this use, the stipulations above, and a long history of use, and current levels of use, camping on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul L Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
(Signature and Date)

Mandatory 10- year Re-evaluation Date: January 9, 2019

Literature Cited

Blakesley, J.A. and K.P. Reese. 1988. Avian use of campground and noncampground sites in riparian zones. J. Wildl. Manage. 52(3):399-402

Clevenger, GA. and G. W. Workman. 1977. The effects of campgrounds on small mammals in Canyonlands and Arches National Parks, Utah. Trans. 42nd North Amer. Wildl. Conf.: 473-484.

Cole, D.N. 1981. Managing ecological impacts at wilderness campsites: an evaluation of techniques. J. of Forestry. 79(2):86-89.

Cole, D. N. 1992. Modeling wilderness campsites: factors that influence amount of impact. Environ. Manag. 16(2):255-264.

Cole, D. N. 1995. Disturbance of natural vegetation by camping: experimental applications of low-level stress. Environ. Manag. 19(3):405-416

Cole, D. N. and J.L. Marion. 1988. Recreation impacts in some riparian forests of the eastern United States. Environ. Manag. 12(1): 99-107.

Foin, T.C., E. O. Garton, C.W. Bowen, J.M. Everingham, R.O. Schultz and B. Holton. 1977. Quantitative studies of visitor impacts on environments of Yosemite National park, California, and their implications for park management policy. J. of Environ. Manage. 5:1-22.

Garton, E. O., B. Hall and T.C. Foin. 1977. The impact of a campground on the bird community of a lodgepole pine forest *In*: T.C. Foin, Ed. Visitor impacts on national parks: the Yosemite ecological impact study. Inst. Ecol. Publ. 10. Univ. of Calif., Davis

Hammitt, W. E. and D N. Cole. 1998. Wildland recreation: ecology and management. 2nd Ed. John Wiley & Sons, NY.

Knight, R.L. and K. J. Gutzwiller, Eds. 1995. Wildlife and recreationists: coexistence through management and research. Island Press, Wash., D.C.

Leung, Y. and J.L. Marion. 2000. Recreation impacts and management in wilderness: a state-of-knowledge review *In*: Cole, D., McCool, S.F., Borrie, W.T., O'Loughlin, J. Comps. Wilderness science in a time of change conference. Vol. 5: Wilderness ecosystems, threats, and management: 1999 May 23-27, Missoula, MT. Proc. RMRS-P-15-Vol. 5: 23-48

Marion, J.L. 2003. Camping impact management on the Appalachian National Scenic Trail. Appalachian Trail Conference, Harpers Ferry, WV.

Marion, J.L. and D.N. Cole. 1996. Spatial and temporal variation in soil and vegetation impacts on campsites. Ecol. Applic. 6(2): 520-530

APPENDIX 1.

Remote Campsites in the Umbagog Lake Area Managed by the State of New Hampshire.

Site Number	Ownership	Management	Comments
R1	SPNHF	Umbagog State Park	
R 2	SPNHF	Umbagog State Park	
R 3	USFWS	Umbagog State Park	
R 4	SPNHF	Umbagog State Park	
R 5	SPNHF	Umbagog State Park	
R 6	NH	Umbagog State Park	
R 7	NH	Umbagog State Park	
R 8	NH	Umbagog State Park	
R 9	SPNHF	Umbagog State Park	
R 10	SPNHF	Umbagog State Park	
R 11	NH	Umbagog State Park	
R 12	NH	Umbagog State Park	
R 13	USFWS	Umbagog State Park	
R 14	USFWS	Umbagog State Park	
R 15	USFWS	Umbagog State Park	
R 16	USFWS	Umbagog State Park	
R 18	USFWS	Umbagog State Park	
R 21	USFWS	Umbagog State Park	
R 22	USFWS	Umbagog State Park	
R 23	USFWS	Umbagog State Park	
R 24	NH	Umbagog State Park	
R 25	NH	Umbagog State Park	
R 26	NH	Umbagog State Park	
R 27	NH	Umbagog State Park	
R 28	USFWS	Umbagog State Park	
R 29	USFWS	Umbagog State Park	
R 30	NH	Umbagog State Park	
R 31	NH	Umbagog State Park	

Site Number	Ownership	Management	Comments
R 33	NH	Umbagog State Park	
R 34	NH	Umbagog State Park	
R 35	NH, USFWS	Umbagog State Park	
R 36	NH	Umbagog State Park	
R 37	NH	Umbagog State Park	
R 38	NH	Umbagog State Park	
North 1	USFWS	Mollidgewock State Park	Closure planned
North 2	USFWS	Mollidgewock State Park	Closure planned
North 3	Private	Mollidgewock State Park	

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Research conducted by non-refuge personnel

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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** X

Refuge Manager: Paul L Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Research by conducted by non-refuge personnel

Narrative

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 Fish and Game Agencies, that address important management issues, or demonstrate techniques for managing species or habitats.

Researchers will submit a final report to the refuge on completing their work. For long-term studies, we may also require interim progress reports. We expect researchers to publish in peer-reviewed publications. All reports, presentations, posters, articles or other publications will acknowledge the Refuge System and the Lake Umbagog refuge as partners in the research. All posters will adhere to Service graphics standards. We will insert this requirement to ensure that the research community, partners, and the public understand that the research could not have been conducted without the refuge having been established, its operational support, and that of the Refuge System.

USE: Research conducted by non-refuge personnel

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITY:

1. Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901 (b)
2. Migratory Bird Conservation Act (16 U.S.C. 715d)
3. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))
4. Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

PURPOSE(S) FOR WHICH ESTABLISHED:

1. the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions. 16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986)

2. for use as an inviolate sanctuary, or for any other management purpose, for migratory birds. 16 U.S.C. 715d (Migratory Bird Conservation Act)

3. for the development, advancement, management, conservation, and protection of fish and wildlife resources 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956)

4. for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:
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 research conducted by non-Service personnel. Research conducted by non-Service personnel 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), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?
The location of the research will vary depending on the individual research project that is being conducted. The entire refuge is 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.

(c) When would the use be conducted?
The timing of the research will depend entirely on the individual research project that is being conducted. Scientific research will 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. If a research project occurs during the refuge hunting season, special precautions will be required and enforced to ensure public health and safety.

(d) How would the use be conducted?
The mechanics of the research will depend entirely on the individual research project that is conducted. The objectives, methods, and approach of each research project will be carefully scrutinized 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 study plan and protocol or if it compromises public health and safety.

(e) Why is this use being proposed?
Research by non-Service personnel is conducted by colleges, universities, Federal, State, and local agencies, non-governmental organizations, and qualified members of the general public to further the understanding of the natural environment and to improve the management of the refuge's natural resources. Much of the information generated by the research is applicable to management on and near the refuge. Past projects on the refuge have studied loons, contaminants, peatland systems, birds, forest structure, and fish. A multi-year study was begun on the refuge in 2005, in cooperation with the Audubon Society of New Hampshire, to look at 1) levels of public use on Umbagog Lake and it's affects on wildlife 2) a systems analysis of the lake system and its associated wetlands and 3) a contaminants study.

The Service encourages and supports research and management studies on refuge lands that will improve and strengthen natural resource management decisions. The refuge manager encourages and seeks research relative to approved refuge objectives that clearly improves habitat management and promotes adaptive management. Priority research addresses information that will better manage the Nation's biological resources and are generally considered important to: Agencies of the Department of Interior; the U.S. Fish and Wildlife Service; the National Wildlife Refuge System; and State Fish and Game Agencies, and that address important management issues or demonstrate techniques for management of species and/or habitats.

The refuge also considers research for other purposes which may not be directly related to refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation and management of native populations of fish, wildlife and plants, and their natural diversity within the region or flyway. These proposals must comply with the Service's compatibility policy.

Refuge support of research directly related to refuge objectives may take the form of funding, in-kind services such as housing or use of other facilities, vehicles, boats, or equipment, direct staff assistance with the project in the form of data collection, provision of historical records, conducting of management treatments, or other assistance as appropriate.

Availability of Resources:
The bulk of the cost for research is incurred in staff time to review research proposals, coordinate with researchers and write Special Use Permits. In some cases, a research project may only require one day of staff time to write a Special Use Permit. In other cases, a research project may take many weeks, as the refuge staff must coordinate with students and advisors and accompany researchers on site visits.

Annual costs associated with the administration of outside research on the refuge are estimated below:

Refuge biologist (GS12) (review proposals, coordinate with researchers):	$6,800	4 weeks/yr
Deputy Refuge Manager (GS12) (review proposals, special use permits, housing and vehicle coordination:	$3,500	2 weeks/yr
Refuge Manager (GS13) (coordination; budgeting):	$2,100	1 weeks/yr
Administrative Assistant (GS6) (office administration):	$2,700	3 weeks/yr
Maintenance Worker (WG5) (vehicle, boat, housing maintenance):	$950	1 weeks/yr
Total:	$16,050	

Anticipated Impacts of the Use:
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, banding, collecting blood, and accessing the study area by foot, boat, or vehicle. These impacts could be exacerbated by multiple concurrent research projects. It is possible that direct mortality could result as a by-product of research activities. Overall, however, allowing research to be conducted by non-Service personnel should have little impact on Service interests. If the research project is conducted with professionalism and integrity, the knowledge gained far outweighs potential adverse impacts.

Research conducted by non- Service personnel on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. These threats are mitigated by the stipulations required under this compatibility determination.

This will potentially benefit Goal 5 of the CCP "Develop high quality interpretative opportunities…" when research presents the opportunity and information to interpret the refuge. Goal 7 of the CCP

"Develop Umbagog National Wildlife Refuge as an outstanding center for research…" will benefit greatly from this activity as it is an essential activity for this goal. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment:
As part of the CCP process for Lake Umbagog NWR this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

___ Use is Not Compatible

_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:
All researchers will be required to submit a detailed research proposal following Lake Umbagog National Wildlife Refuge's study proposal guidelines (Appendix 1) and Service Policy (FWS Refuge Manual Chapter 4 Section 6). The refuge must be given at least 45 days to review proposals before initiation of research. If collection of wildlife is involved, the refuge must be given 60 days to review the proposal. All necessary scientific collecting or other permits must be obtained prior to the commencement of the research. Proposals will be prioritized and approved based on need, benefit, compatibility, and funding required.

Researchers will be expected to submit a final report to the Refuge, on completion of their work. For long-term studies, interim progress reports may also be required. The Refuge also expects that research will be published in peer-reviewed publications. The contribution of the Refuge and the Service should be acknowledged in any publications.

Special Use Permits (SUP) will be required for all research conducted by non-Service personnel. The SUP will list all conditions that are necessary to ensure compatibility. The Special Use Permits will also identify a schedule for annual progress reports and the submittal of a final report or scientific paper.

The Regional refuge biologists, other Service Divisions, State agencies, academic experts, may be asked to review and comment on proposals.

All researchers will be required to obtain appropriate State and Federal permits.

Researchers will be required to take steps to insure that invasive species and pathogens (particularly aquatic invasives and pathogens) are not inadvertently introduced or transferred to the Umbagog system.

Justification: The Service encourages approved research to further understanding of refuge natural resources and management. Research by non- Service personnel adds greatly to the information base for Refuge Managers to make proper decisions. Research conducted by non- Service personnel on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul L Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
(Signature and Date)

Mandatory 10-year Re-evaluation Date: January 9, 2019

Literature Cited:

U.S. Fish and Wildlife Service. 1985. Refuge Manual. Washington, D.C.: U.S. Government Printing Office.

APPENDIX 1. Lake Umbagog National Wildlife Refuge Study Proposal Guidelines

A study proposal is a justification and description of the work to be done, and includes cost and time requirements. Proposals must be specific enough to serve as "blueprints" for the investigative efforts. Step-by-step plans for the actual investigations must be spelled out in advance, with the level of detail being commensurate with the cost and scope of the project and the needs of management. Please submit proposals electronically as an MS Word document or hardcopy to the refuge manager.

The following list provides a general outline of first order headings/sections for study proposals.

- Cover Page
- Table of Contents (for longer proposals)
- Abstract
- Statement of Issue
- Literature Summary
- Objectives/Hypotheses
- Study Area
- Methods and Procedures
- Quality Assurance/Quality Control
- Specimen Collections
- Deliverables
- Special Requirements, Concerns, Necessary Permits
- Literature Cited
- Peer Review
- Budget
- Personnel and Qualifications

Cover Page

The cover page must contain the following information:

- Title of Proposal
- Current Date
- Investigator's(s')—name, title, organizational affiliation, address, telephone and fax numbers and e-mail address of all investigators or cooperators.
- Proposed Starting Date
- Estimated Completion Date
- Total Funding Support Requested from the US Fish and Wildlife Service
- Signatures of Principal Investigator(s) and other appropriate institutional officials

Abstract

The abstract should contain a short summary description of the proposed study, including reference to major points in the Statement of Issue, Objectives, and Methods and Procedures sections.

Statement of Issue

Provide a clear precise summary of the problem to be addressed and the need for its solution. This section should include statements of the importance, justification, relevance, timeliness, generality,

and contribution of the study. Describe how any products will be used, including any anticipated commercial use. What is the estimated probability of success of accomplishing the objective(s) within the proposed timeframe?

Literature Summary

This section should include a thorough but concise literature review of current and past research that pertains to the proposed research, especially any pertinent research conducted at the Lake Umbagog National Wildlife Refuge. A discussion of relevant legislation, policies, and refuge planning and management history, goals, and objectives should also be included.

Objectives/Hypotheses

A very specific indication of the proposed outcomes of the project should be stated as objectives or hypotheses to be tested. Project objectives should be measurable. Provide a brief summary of what information will be provided at the end of the study and how it will be used in relation to the problem. These statements should flow logically from the statement of issue and directly address the management problem.

Establish data quality objectives in terms of precision, accuracy, representativeness, completeness, and comparability as a means of describing how good the data need to be to meet the project's objectives.

Study Area

Provide a detailed description of the geographic area(s) to be studied and include a clear map delineating the proposed study area(s) and showing specific locations where work will occur.

Methods and Procedures

This section should describe as precisely as possible how the objectives will be met or how the hypotheses will be tested. Include detailed descriptions and justifications of the field and laboratory methodology, protocols, and instrumentation. Explain how each variable to be measured directly addresses the research objective/ hypothesis. Describe the experimental design, population, sample size, and sampling approach (including procedures for sub-sampling). Summarize the statistical and other data analysis procedures to be used. List the response variables and tentative independent variables or covariates. Describe the experimental unit(s) for statistical analysis. Also include a detailed project time schedule that includes start, fieldwork, analysis, reporting, and completion dates.

Quality Assurance/Quality Control

Adequate quality assurance/quality control (QA/QC) procedures help insure that data and results are: credible and not an artifact of sampling or recording errors; of known quality; able to stand up to external scientific scrutiny; and accompanied by detailed method documentation. Describe the procedures to be used to insure that data meet defined standards of quality and program requirements, errors are controlled in the field, laboratory, and office, and data are properly handled, documented, and archived. Describe the various steps (e.g. personnel training, calibration of equipment, data verification and validation) that will be used to identify and eliminate errors introduced during data collection (including observer bias), handling, and computer entry. Identify the percentage of data that will be checked at each step.

Specimen Collections
Clearly describe the kind (species), numbers, sizes, and locations of animals, plants, rocks, minerals, or other natural objects to be sampled, captured, or collected. Identify the reasons for collecting, the intended use of all the specimens to be collected, and the proposed disposition of collected specimens. For those specimens to be permanently retained as voucher specimens, identify the parties responsible for cataloging, preservation, and storage and the proposed repository.

Deliverables
The proposal must indicate the number and specific format of hard and/or electronic media copies to be submitted for each deliverable. The number and format will reflect the needs of the refuge and the Refuge manager. Indicate how many months after the project is initiated (or the actual anticipated date) that each deliverable will be submitted. Deliverables are to be submitted or presented to the refuge manager.

Deliverables that are required are as follows:

Reports and Publications
Describe what reports will be prepared and the timing of reports. Types of reports required in fulfillment of natural and social science study contracts or agreements include:

(1) Progress report(s) (usually quarterly, semiannually, or annually): (may be required)
(2) Draft final and final report(s): (always required).

A final report must be submitted in addition to a thesis or dissertation (if applicable) and all other identified deliverables. Final and draft final reports should follow refuge guidelines (Appendix I).

In addition, investigators are encouraged to publish the findings of their investigations in refereed professional, scientific publications and present findings at conferences and symposia. The Refuge manager appreciates opportunities to review manuscripts in advance of publication.

Data Files
Provide descriptions of any spatial (GIS) and non-spatial data files that will be generated and submitted as part of the research. Non-spatial data must be entered onto Windows CD ROMs in Access or Excel. Spatial data, which includes GPS generated files, must be in a format compatible with the refuge's GIS system (ArcGIS 8 or 9, Arcview 3.3, or e00 format) . All GIS data must be in UTM 19, NAD 83.

Metadata
For all non-spatial and spatial data sets or information products, documentation of information (metadata) describing the extent of data coverage and scale, the history of where, when, and why the data were collected, who collected the data, the methods used to collect, process, or modify/transform the data, and a complete data dictionary must also be provided as final deliverables. Spatial metadata must conform to US Fish & Wildlife Service (FGDC) metadata standards.

Oral Presentations
Three types of oral briefings should be included: pre-study, annual, and closeout.
These briefings will be presented to refuge staff and other appropriate individuals and cooperators. In addition, investigators should conduct periodic informal briefings with refuge staff throughout the study whenever an opportunity arises. During each refuge visit, researchers should provide verbal updates on project progress. Frequent dialogue between researchers and refuge staff is an essential element of a successful research project.

Specimens and Associated Project Documentation
A report on collection activities, specimen disposition, and the data derived from collections, must be submitted to the refuge following refuge guidelines.

Other:
Researchers must provide the Refuge manager with all of the following:

1. Copies of field notes/ notebooks/ datasheets
2. Copies of raw data (in digital format), including GIS data, as well as analyzed data
3. Copies of all photos, slides (digital photos preferred), videos, films
4. Copies of any reports, theses, dissertations, publications or other material (such as news articles) resulting from studies conducted on refuge.
5. Detailed protocols used in study
6. Aerial photographs
7. Maps
8. Interpretive brochures and exhibits
9. Training sessions (where appropriate)
10. Survey forms
11. Value-added software, software developed, models

Additional deliverables may be required of specific studies.

Special Requirements, Permits, and Concerns
Provide information on the following topics where applicable. Attach copies of any supporting documentation that will facilitate processing of your application.

Refuge Assistance
Describe any refuge assistance needed to complete the proposed study, such as use of equipment or facilities or assistance from refuge staff. It is important that all equipment, facilities, services, and logistical assistance expected to be provided by the Fish and Wildlife Service be specifically identified in this section so all parties are in clear agreement before the study begins.

Ground Disturbance
Describe the type, location, area, depth, number, and distribution of expected ground- disturbing activities, such as soil pits, cores, or stakes. Describe plans for site restoration of significantly affected areas.

Proposals that entail ground disturbance may require an archeological survey and special clearance prior to approval of the study. You can help reduce the extra time that may be required to process such a proposal by including identification of each ground disturbance area on a USGS 7.5-minute topographic map.

Site Marking and/or Animal Marking
Identify the type, amount, color, size, and placement of any flagging, tags, or other markers needed for site or individual resource (e.g. trees) identification and location. Identify the length of time it is needed and who will be responsible for removing it. Identify the type, color, placement of any tags placed on animals (see special use permit for stipulations on marking and handling of animals)

Access to Study Sites
Describe the proposed method and frequency of travel to and within the study site(s).
Explain any need to enter restricted areas. Describe duration, location, and number of participants, and approximate dates of site visits.

Use of Mechanized and Other Equipment
Describe any vehicles, boats, field equipment, markers, or supply caches by type, number, and location. You should explain the need to use these materials and if or how long they are to be left in the field.

Safety
Describe any known potentially hazardous activities, such as electro-fishing, scuba diving, whitewater boating, aircraft use, wilderness travel, wildlife capture or handling, wildlife or immobilization.

Chemical Use
Identify chemicals and hazardous materials that you propose using within the refuge.
Indicate the purpose, method of application, and amount to be used. Describe plans for storage, transfer, and disposal of these materials and describe steps to remediate accidental releases into the environment. Attach copies of Material Safety Data Sheets.

Animal Welfare
If the study involves vertebrate animals, describe your protocol for any capture, holding, marking, tagging, tissue sampling, or other handling of these animals (including the training and qualifications of personnel relevant to animal handling and care). If your institutional animal welfare committee has reviewed your proposal, please include a photocopy of their recommendations. Describe alternatives considered, and outline procedures to be used to alleviate pain or distress. Include contingency plans to be implemented in the event of accidental injury to or death of the animal. Include state and federal permits. Where appropriate, coordinate with and inform state natural resource agencies.

Literature Cited
List all reports and publications cited in the proposal.

Peer Review

Provide the names, titles, addresses, and telephone numbers of individuals with subject-area expertise who have reviewed the research proposal. If the reviewers are associated with the investigator's research institution or if the proposal was not reviewed, please provide the names, titles, addresses, and telephone numbers of 3-5 potential subject-area reviewers who are not associated with the investigator's institution. These individuals will be asked to provide reviews of the proposal, progress reports, and the draft final report.

Budget

If Service funding or assistance (i.e. in-kind contributions) is involved in the research project, a budget must accompany the proposal detailing both funding and assistance that will be requested from the Fish and Wildlife Service and the cooperator's contributions on an identified periodic (usually annual) basis.

Personnel Costs

Identify salary charges for principal investigator(s), research assistant(s), technician(s), clerical support, and others. Indicate period of involvement (hours or months) and pay rate charged for services. Be sure to include adequate time for data analysis and report writing and editing.

Fringe Benefits

Itemize fringe benefit rates and costs.

Travel

Provide separate estimates for fieldwork and meetings. Indicate number of trips, destinations, estimated miles of travel, mileage rate, air fares, days on travel, and daily lodging and meals charges. Vehicle mileage rate cannot exceed standard government mileage rates. Charges for lodging and meals are not to exceed the maximum daily rates set for the locality by the Federal Government (contact Lake Umbagog NWR for appropriate rates).

Equipment

Itemize all equipment to be purchased or rented and provide a brief justification for each item costing more than $1,000. Be sure to include any computer-related costs. For proposals funded under US Fish and Wildlife Service agreement or contract, the refuge reserves the right to transfer the title of purchased equipment with unit cost of $1,000 or more to the Federal Government following completion of the study. These items should be included as deliverables.

Supplies and Materials

Purchases and rentals under $1,000 should be itemized as much as is reasonable.

Subcontract or Consultant Charges

All such work must be supported by a subcontractor's proposal also in accordance with these guidelines.

Specimen Collections
Identify funding requirements for the cataloging, preservation, storage, and analyses of any collected specimens that will be permanently retained.

Printing and Copying
Include costs for preparing and printing the required number of copies of progress reports, the draft final report, and the final report. In general, a minimum of two (2) copies of progress reports (usually due quarterly, semiannually, or as specified in agreement), the draft final report, and the final report are required.

Indirect Charges
Identify the indirect cost (overhead) rate and charges and the budget items to which the rate is applicable.

Cooperator's Contributions
Show any contributing share of direct or indirect costs, facilities, and equipment by the cooperating research institution.

Outside Funding
List any outside funding sources and amounts.

Personnel and Qualifications
List the personnel who will work on the project and indicate their qualifications, experience, and pertinent publications. Identify the responsibilities of each individual and the amount of time each will devote. A full vita or resume for each principal investigator and any consultants should be included here.

APPENDIX 1. INTERIM FINAL REPORT GUIDELINES

Draft final and final reports should follow Journal of Wildlife Management format or other refuge pre-approved format and typically includes the following sections:

- Title Page
- Abstract
- Introduction/ Problem statement
- Study Area
- Methods (including statistical analyses)
- Results
- Discussion
- Management Implications
- Management Recommendations
- Literature Cited

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Privately owned recreational cabins (camps)

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document? **Establishing EA**	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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** X

Refuge Manager: Paul L Casey Date: 1-6-09

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: Janet McKenney Date: 1-9-2009

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

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Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Privately owned recreational cabins (camps)

Narrative

The environmental assessment (EA) establishing the refuge states that when the Service acquires land in fee with a pre-existing cabin lease, camp owners may either sell the building, or "continue to lease the land from the Service instead of the timber company on a yearly basis" (USFWS, 1991). Although we established the refuge in 1992, we acquired no tracts with cabin leases until 1995. By 1996, the refuge owned tracts containing 24 pre-existing cabin lease agreements.

This use existed before refuge ownership. Timber companies who transferred lands to the Service insisted that leases be carried forward as part of the purchase agreement. At the time the Service established the refuge, we felt that trade-off was worthwhile, because it would result ultimately in enhanced protection for the shoreline by precluding additional development. The original conservation proposal for Umbagog Lake involved a partnership between the Service and the State of New Hampshire, among others. Both the Service and the state acquired cabin leases as part of that proposal. Both agencies have developed a coordinated, consistent approach to the use and eventual phase-out of cabin leases. By managing this cabin lease program, the Service is following through on earlier commitments and ensuring that our approach is consistent with that of the State of New Hampshire.

COMPATIBILITY DETERMINATION

USE: Occupancy and use of privately owned recreational cabins (camps)

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITIES

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C. 3901(b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4)]
4. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(b)(1)]

PURPOSES FOR WHICH ESTABLISHED

1. "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions…." [16 U.S.C. 3901(b); Emergency Wetlands Resources Act of 1986]

2 "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." [16 U.S.C. 715d; Migratory Bird Conservation Act]

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…." [16 U.S.C. 742f(a)(4); Fish and Wildlife Act of 1956]

4. "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…." [16 U.S.C. 742f(b)(1); Fish and Wildlife Act of 1956]

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM

"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." — National Wildlife Refuge System Improvement Act of 1997 (Public Law 105–57; 111 Stat. 1282)

DESCRIPTION OF USE

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

The use is the occupancy and use of privately owned recreational cabins (camps). It 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.

Some recreational cabins, or camps, existed on the shores of the Magalloway River and Umbagog Lake as early as the late 1800s. William Brewster, a well-known regional ornithologist, built a summer cabin on Pine Point in 1893 (Heywood, 1973). Private timber companies originally owned most of the land around the lake and rivers, and built early cabins to provide lodging for company employees. By the 1960s, an increasing number of private individuals owned and maintained seasonal cabins for fishing and other recreation. Most timber companies developed recreational leases that, for an annual fee, allowed private individuals to build and use cabins on company land. The leases required annual renewal or, in some cases, every 2 to 5 years. Families often passed down the ownership and use of those cabins from generation to generation. As industrial timberlands changed hands among companies, so did the lease agreements; the new company often took over the management of any pre-existing leases.

The environmental assessment (EA) establishing the refuge states "In general, camps will remain; however, no new camps will be constructed. The Service will remain an interested buyer of camps within the proposal area" (USFWS, 1991). In addition, the EA state that when the Service acquires land in fee with a pre-existing cabin lease, camp owners may either sell the building, or "continue to lease the land from the Service instead of the timber company on a yearly basis" (USFWS, 1991). Although we established the refuge in 1992, we acquired no tracts with cabin leases until 1995. By 1996, the refuge owned tracts containing 24 pre-existing cabin lease agreements.

The majority of the cabin leases were on lands we purchased from James River Corp (currently, 17). We acquired additional lands with lease agreements in place from Boise Cascade Co. (currently, 6), Mead-Oxford Paper Co. (currently, 5), and Yankee Forest LLC (currently, 1). The timber companies that initially transferred lands with pre-existing leases to the Service insisted that their leaseholders be treated fairly, and that leases not be quickly terminated. When the State of New Hampshire purchased land along the western shore of Umbagog Lake and on Tidswell Point, it also acquired a number of pre-existing cabin leases. The state established conditions that included a maximum lease period of 50 years for leased land.

Most current lessees reside in surrounding communities (e.g., Errol, Berlin, Milan, and Gorham) or elsewhere in New Hampshire, but about a third maintain permanent residences outside New Hampshire. At least 10 camps on refuge property have changed ownership one or more times since 1995. The majority of the camps are of one-story, wood or log construction, and typically are small (<600 square feet).

(b) Where would the use be conducted?

The majority of the camps is located along the Magalloway River, north of the refuge office, and around Umbagog Lake, with most concentrated around Thurston Cove and along the northeast shoreline of the lake. Most cabins are accessible by road, but some are accessible only by boat during the summer. Lot sizes are small (generally, half an acre). The construction of new cabins will not be permitted.

Cabins are located in the wooded floodplain along the Magalloway River and lakeshore pine-hemlock, northern hardwood, and mixed conifer/hardwood habitats along Umbagog Lake. Some cabins are located near loon territories.

(c) When would the use be conducted?
Most cabins are occupied during the summer months; heaviest use is on weekends and holidays. However, camps are also used for hunting in the fall and snowmobiling in the winter. The duration of use is commonly short-term. Only seasonal use is permitted. The camps cannot be used as permanent, year-round residences.

(d) How would the use be conducted?
When the refuge first acquired refuge lands with pre-existing recreational leases, the Service agreed to permit their occupancy and use up to a 50-year maximum from the date of acquisition, as long as the use was determined to be compatible. The ownership of leases can be transferred outside the immediate family only during a pre-determined period.

Under Service land ownership, the use and occupancy of these camps will be administered through a system of special use permits (SUPs), the conditions of which are analogous to the former lease. We review the leases at least once every 5 years, and renew permits annually. We assess annual fees based on the appraised value of the property, and may adjust the fees periodically to reflect market rates.

The conditions of the SUPs require that cabins must be maintained in a manner compatible with the purposes of the refuge and produce the least amount of environmental disturbance. Cabins may only be used for non-commercial recreational purposes, and cannot be used as a principal place of residence. Modifications of existing structures require prior approval by the refuge manager. All structures must be >250 ft. from water, and no permanent docks may be constructed. Cutting live vegetation is restricted. We do not post the camp lots, but expect the public to reasonably respect the privacy of camp owners. A complete description of permit conditions for each cabin may be viewed on file at the refuge headquarters.

(e) Why is this use being proposed?
This use existed before refuge ownership. Timber companies who transferred lands to the Service insisted that leases be carried forward as part of the purchase agreement. At the time the Service established the refuge, we felt that trade-off was worthwhile, because it would result ultimately in enhanced protection for the shoreline by precluding additional development. The original conservation proposal for Umbagog Lake involved a partnership between the Service and the State of New Hampshire, among others. Both the Service and the state acquired cabin leases as part of that proposal. Both agencies have developed a coordinated, consistent approach to the use and eventual phase-out of cabin leases. By managing this cabin lease program, the Service is following through on earlier commitments and ensuring that our approach is consistent with that of the State of New Hampshire.

Availability of Resources
The refuge staff time associated with administering this use primarily relates to processing annual permit fees, answering the questions of lessees concerning conditions of the permits, monitoring

compliance with those conditions, and monitoring potential impacts of the use on refuge resources and visitors. The refuge manager and deputy refuge manager will administer the lease program. The refuge wildlife biologist will monitor the impacts of the use on refuge resources. No special equipment, facilities, or resources are needed to administer this use. We do not direct refuge resources for law enforcement toward providing safety for permit holders or security for their property, beyond that which is expected for the general visiting public. The maintenance of the camps and associated lots are the responsibility of the permit holders. We submit permit fees to the refuge revenue sharing account.

We estimate below the annual costs associated with the administration of the cabin lease program on the refuge.

Program Oversight:	$3,000	(Refuge Manager/ Deputy Manager)
Processing Annual Permit Fees:	$1,000	(Administrative Assistant)
Resource Impact Monitoring:	$1,000	(Wildlife Biologist)
Total Annual Cost of Program:	$5,000	

Anticipated Impacts of the Use

The possible impacts of this use include the direct loss of habitat, possible wildlife disturbances caused by camp occupancy or camp users traveling along roads, slight additional hunting pressure on upland species, and impacts on sensitive wetland areas because of the location of some camps. This is a short-term use and, as permits expire or owners sell camps to the Service, most if not all of the camps will be moved or destroyed. Therefore, the program will cause no long-term loss of habitat.

We do not consider the disturbance of wildlife by permit holders traveling to or occupying the camps significant, for the following reasons. The number of camps is low; they generally are not located close to any known, major concentrations of waterfowl, shorebirds, or other wildlife; and, travel or other activities by camp owners do not differ substantially in type or intensity from those of the general public in allowed, daily uses.

We allow hunting, whether by camp occupants or the public, according to state regulations, and set harvest levels so as not to affect populations. We performed an Environmental Site Assessment Level 1 Survey on refuge lands prior to purchase, and identified no contaminant problems around the camps. We also performed Level 1 surveys on all the camps we purchased. Again, we observed no problems. The results of subsequent, more detailed environmental surveys and plant and wildlife inventories could affect future compatibility determinations for individual camps. If so, we could then consider remedial measures, including relocation.

The original Final Environmental Assessment (USFWS, 1991) determined that the locations and numbers of the cabins on Umbagog Lake were compatible with wildlife and water quality up to that time. However, the expansion of lakeshore cabins or home development was determined to be incompatible.

The occupancy and use of privately owned camps on the refuge will not extend beyond 50 years. Meanwhile, we designed the conditions for the permits to help maintain the compatibility of this use, reduce negative impacts on refuge resources, and minimize conflicts among refuge management activities and other uses of the refuge.

Therefore, the occupancy and use of privately owned recreational camps on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. This is a short-term use and, as permits expire or owners sell camps to the Service, most if not all of the camps will be moved or destroyed. Therefore, the program will cause no long-term loss of habitat.

No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment
As part of the comprehensive conservation planning process for the Lake Umbagog refuge, this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one)

___ This Use Is Not Compatible

_**X**_ This Use Is Compatible, with the following stipulations

Stipulations Necessary to Ensure Compatibility
Cabin leases will be reviewed at least once every 5 years to ensure their continued compatibility. The stipulations necessary to ensure compatibility are on file at refuge headquarters.

Justification
This use has been determined to be compatible, provided the conditions of the Special Use Permits are implemented. The use will not pose significant adverse effects on trust species or other refuge resources, will not interfere with public use of the refuge, or cause an undue administrative burden. The refuge manager will re-evaluate the compatibility of this use every 10 years.

The occupancy and use of privately owned recreational camps on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul L Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D Léger 1-9-09
(Signature and Date)

Re-evaluation date: Jan 9, 2014

Literature Cited

Heywood, C. E. 1973. History of Upton, Maine. Oxford Hills Press, Norway, ME, 104 p.

U.S. Fish and Wildlife Service. 1991. Final environmental assessment: proposal to protect wildlife habitat, Lake Umbagog, Coos Co., NH, Oxford Co., ME. USFWS, Region 5.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Motorized and non-motorized boating

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? **Open waters within refuge**	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	**X**	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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** X

Refuge Manager: Paul L Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Motorized and Non-motorized Boating

Narrative

Hunting, fishing wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the Refuge System, and have been determined to be compatible activities on many refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Motorized and non-motorized boating is an appropriate means of facilitating these priority public uses on Lake Umbagog Refuge. By allowing this use, we are providing opportunities and facilitating refuge programs in a manner and location that offer high quality, wildlife-dependent recreation and maintain the level of current fish and wildlife values.

COMPATIBILITY DETERMINATION

USE: Motorized and non-motorized boating

REFUGE NAME: Lake Umbagog National Wildlife Refuge

DATE ESTABLISHED: November 12, 1992

ESTABLISHING AUTHORITIES

1. Emergency Wetlands Resources Act of 1986 [16 U.S.C. 3901(b)]
2. Migratory Bird Conservation Act [16 U.S.C. 715d]
3. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4)]
4. Fish and Wildlife Act of 1956 [16 U.S.C. 742f(b)(1)]

PURPOSES FOR WHICH ESTABLISHED

1. "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions." [16 U.S.C. 3901(b); Emergency Wetlands Resources Act of 1986]

2. "for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." [16 U.S.C. 715d; Migratory Bird Conservation Act]

3. "for the development, advancement, management, conservation, and protection of fish and wildlife resources…." [16 U.S.C. 742f(a)(4); Fish and Wildlife Act of 1956]

4. "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…. [16 U.S.C. 742f(b)(1); Fish and Wildlife Act of 1956]

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM

"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." — National Wildlife Refuge System Improvement Act of 1997 (Public Law 105–57; 111 Stat. 1282)

DESCRIPTION OF USE

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

The use is motorized and non-motorized boating. Motorized and non-motorized boating 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 would the use be conducted?
Motorized and non-motorized boating would be conducted on all open waters within the refuge open to compatible public use programs.

(c) When would the use be conducted?
Motorized and non-motorized boating will be allowed during the hours and in the seasons identified for refuge public use programs, including hours specified in the respective state regulations.

(d) How would the use be conducted?
Motorized and non-motorized boating would be allowed as a means to facilitate refuge public use programs, namely the priority public use programs of hunting, fishing, wildlife observation and photography, and environmental education and interpretation. The use would be conducted consistent with refuge and New Hampshire and Maine regulations, with some additional restrictions to protect fish, wildlife and habitat, and reduce potential conflicts among public uses.

Boat access is available at a number of locations both on and off refuge ownership near Umbagog Lake. Two State of New Hampshire public boat launches provide boat trailer access to the upper Androscoggin River, Magalloway River, the mouth of the Rapid River, and Umbagog Lake. One launch is located upstream of the Errol Dam, the other at the southern end of Umbagog Lake. We provide additional boat-trailer access on refuge-owned land at the Steamer Diamond landing on the Androscoggin River and at refuge headquarters on the Magalloway River. A car-top boat launch is located at Parson's landing on the Magalloway River, just south of refuge headquarters.

The public occasionally launches canoes at other sites along Route 16, where it crosses or approaches the Magalloway and Androscoggin rivers. At some of those sites, inadequate parking or poor visibility of oncoming traffic present safety hazards. The refuge is constructing an additional car-top boat launch on the Magalloway River, north of refuge headquarters. The new site will provide parking, a dock, and a restroom. After completing that new site, we will close all refuge-owned boat access points along Route 16, except the present access at refuge headquarters and the Steamer Diamond Landing. All boats launching or landings on refuge lands must follow state boating regulations and, if applicable, show registration with the appropriate state.

The public must inspect all boats and boat trailers and clean them of aquatic invasive species before launching at refuge sites. That cleaning should take place on dry ground well away from the water. Exotic, nuisance plants or animals on boats, trailers, diving equipment, or in bait buckets can disrupt aquatic ecosystems and negatively affect native fish and plant species. Umbagog Lake and its associated rivers appear to be relatively free of aquatic invasive plants, and cleaning boats, trailers, and other equipment will help to keep them that way. Signs, education, and periodic enforcement will remind the public of these regulations.

(e) Why is the use being proposed?
Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the Refuge System. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses.
Motorized and non-motorized boating is allowed as a means to facilitate these priority public uses. By allowing this use, we are providing opportunities and facilitating refuge programs in a manner and

location that offer high quality, wildlife-dependent recreation and maintain the level of current fish and wildlife values.

Availability of Resources
Facilities or materials needed to support motorized and non-motorized boating include a new car-top boat launch off Route 16, north of the refuge office. FY 2005 funds paid for that launch, and we expect no additional construction expenses. Existing launch sites that we have scheduled for closure may require the installation of closure signs, as well as some site restoration work. Additional resources and staff time will be required to maintain the new boat launch, put down gravel and maintain the Steamer Diamond launch and the Mt. Pond fishing access and spur trail, close off wildlife nesting sites to the public, and provide interpretive materials and brochures. A Refuge Officer and the States of New Hampshire and Maine will provide law enforcement.

We do not anticipate charging fees for motorized and non-motorized boating. We estimate these costs associated with this use.

Routine maintenance:	$7,000	annually. This is the expected cost to maintain the two public boat launches (Magalloway River (north) and Steamer Diamond landing), and includes putting down gravel or wood chips; maintaining parking areas, removing garbage, and maintaining the restroom at the Magalloway River launch.
Supplies and materials:	$6,000.	This includes signs for closed launch sites, buoys and nesting site closure signs, interpretative brochures, regulation brochures (produced in-house)
Monitoring:	$3,000	annually, to be carried out in cooperation with the states.
Law Enforcement:	$3,000	annually for a refuge officer.
Total:	$19,000	

Anticipated Impacts of the Use
Because Umbagog Lake and its rivers are accessible to motorized and non-motorized boats from the two New Hampshire state boat launches, we do not expect a dramatic change from existing conditions.

Potential impacts of motorized and non-motorized boating follow.

- **Accidental introduction of invasive plants, pathogens, or exotic invertebrates**, attached to boats: With the exception of a few isolated occurrences of purple loosestrife, refuge waters appear to be relatively free of invasive aquatic plants and mollusks. However, we have not carried out extensive surveys of aquatic invasive plants. We can limit their impacts by continuing education, outreach, and initiating an intensive monitoring program.

- **Disturbance of wildlife** (particularly breeding and brood-rearing loons, waterfowl, eagles, ospreys, and wading birds): Popular public use boating seasons in Maine and New Hampshire, coincide in part, with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Boaters may disturb nesting birds by approaching too closely to nests, causing nesting birds to flush. Flushing may expose eggs to predation or cooling, resulting in egg mortality. Boat wakes from watercraft may also flood or wash eggs out of nests. Both adult and flightless young birds may be injured or killed if run over by speeding boats. We will continue to close refuge areas seasonally to boating around sensitive nest sites, in conjunction with the States of Maine and New Hampshire. We will also continue our public outreach and the placement of warning signs. We will start monitoring public use in 2006, to help improve our management of public use, fisheries, and wildlife.

- **Negative impacts on water quality** from motorboat and other pollutants, human waste, and litter: Extensive water quality testing on the Umbagog system has not been carried out. The levels of pollutants from boat fuel and impacts on local aquatic systems are unknown. Hydrocarbon contamination can be harmful to fish. We will initiate public outreach and education on littering, pollutants, proper waste disposal, and the advantages of 4-stroke and other low emissions engines to help mitigate water quality impacts. Water quality testing will be carried out as funding levels permit

- **Bank and trail erosion** from human activity (boat landings, boat wakes, foot traffic), which may increase aquatic sediment loads of streams and rivers or alter riparian or lakeshore habitat or vegetation in ways harmful to fish or other wildlife: Boat access will be restricted to designated areas only. Those areas will be 'hardened' to contain impacts in a small area. We will monitor launch sites, and may modify, restore, or close them if conditions warrant. All new boat access construction will follow best management practices. Therefore, at current levels of use, we do not expect increased erosion because of boating activities.

- **Negative impacts from boats on sensitive wetlands** or peatlands and rare wetland plants: Boat access sites will be located away from sensitive wetlands, peatlands, and rare plants. Habitat features important for trout, such as overhanging banks, will be protected from disturbance.

- **Vegetation disturbance associated with installation of new boat launch and fishing access sites:** Although the new boat launch on Route 16 will be located in the floodplain of the Magalloway River, ground disturbance will be minimal. Because fishing will occur from non-motorized watercraft or a dock, we expect no erosion from bank fishing or trampling of vegetation.

- **Conflicts between boaters and other user groups:** We know that some conflicts among motorized and non-motorized boat users have arisen on the refuge in the past. In addition, local cabin owners have expressed concerns about trespass and inappropriate disposal of human waste by boaters, primarily canoeists and kayakers. The comfort station under construction at the Magalloway River launch site should help reduce some of those conflicts. We intend to carry out public use surveys in 2006 that will help identify any additional

conflicts between user groups. Should any significant conflicts become evident, we may need to manage public use on the refuge to minimize conflicts. That may include providing additional education and outreach, providing additional sanitary facilities, or creating zones to separate groups of users.

To summarize, boating on Lake Umbagog National Wildlife Refuge poses only a minimal threat to Goals 1, 2, and 3 ("Manage open water and wetlands," "Manage floodplain and lakeshore habitats," and "Manage upland forested habitats") as written in the CCP. Our continued monitoring of invasive species and outreach at launching sites is necessary to prevent impacts on refuge habitats, plant and wildlife communities. Monitoring will identify any actions needed to respond to new information and correct problems that may arise in the future.

Boating will benefit Goal 4 "Provide high quality wildlife dependent activities" of the CCP by providing opportunities for wildlife observation and photography and access for hunting and fishing. Opportunities also exist to interpret the refuge at boat launches and on a canoe trail. No other refuge goals and objectives, as written in the CCP, will be affected by this use.

Public Review and Comment

As part of the comprehensive conservation planning process for the Lake Umbagog refuge, this compatibility determination underwent extensive public review, including a comment period of 77 days following the release of the Draft CCP/EIS. It will also undergo and additional 30 days of public review during the public review period of the FEIS.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible, with the following stipulations

Stipulations Necessary to Ensure Compatibility

On refuge lands:

- We will permit boat launching only in designated areas to prevent the erosion and degradation of wetlands or water quality and ensure public safety.

- We will close wildlife nesting and brood-rearing areas seasonally to all boating activities, to prevent the disturbance of wildlife. That may include temporarily closing or relocating boating activities and/or access sites.

- Boat launches will be constructed and situated in such a way as to provide for public safety and minimize the disturbance of wildlife and habitat or the effects of siltation. We will use vegetation and other means of stabilizing soils around any culverts at road crossings. Protecting canopy trees from damage by humans will keep stream habitat shaded. We will monitor impacts and close, modify, restore, or move an access area if problems arise.

- We will increase public outreach and education to minimize conflicts among user groups, help control aquatic invasive plants and lead in the environment, reduce the introduction of non-native fish species, and minimize the disturbance of wildlife and habitat.

- A refuge officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.

Justification: Hunting, fishing wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the Refuge System, and have been determined to be compatible activities on many refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Motorized and non-motorized boating is allowed as a means to facilitate these priority public uses on Lake Umbagog Refuge. Boating on Umbagog National Wildlife 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 impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Lake Umbagog NWR CCP.

Signature: Refuge Manager: Paul L Casey 1-6-09
(Signature and Date)

Concurrence: Regional Chief: Anthony D. Léger 1-9-09
(Signature and Date)

Mandatory 10-year Re-evaluation Date: January 9, 2019

Literature Cited

Bonney, F. 2002. Personal communication. Maine Inland Fisheries and Wildlife.

Boucher, D. P.. 1995. Rapid River salmonid management. Fishery Interim Summary Report Ser. No. 95–6. Maine Dept. of Inland Fisheries and Wildlife, Augusta, ME.

Ensor, K.L., D.D. Helwig, and L.C. Wemmer. 1992. The common loon in Minnesota: potential contaminant implications *in* L. Morse, S. Stockwell and M. Pokras, eds. Proc. from the 1992 conference on the loon and its ecosystem: status, management, and environmental concerns, Bar Harbor, ME.

Pokras, M.A. and R. Chafel. 1992. Lead toxicosis from ingested fishing sinkers in adult common loons (*Gavia immer*) in New England. J. of Zoo and Wildl. Med. 23(1):92-97.

Attachment: Map C-1, showing existing and planned boat access points.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: ATV, ORV, or Motorbike Use

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	**X**	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		**X**
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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? **Public understanding and appreciation only.**	**X**	
(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?		**X**

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 X 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 X **Appropriate** ____

Refuge Manager: Paul L Casey Date: 1-6-09

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: [illegible] Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: ATV, ORV and motorbike use

Narrative: This use has the potential to cause erosion and habitat (vegetation) damage. The use also may detract from the quality of other wildlife-dependent uses. The noise and speed of these machines has potential to disturb wildlife especially during the breeding season. Use of all-terrain 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 ATV use if allowed, and to close areas to ATV use if they will cause adverse effects on soil, vegetation, wildlife, habitat or cultural or historic resources. This use is not consistent with any approved refuge management plan and would divert existing and future resources from accomplishing priority tasks.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Geocaching

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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)? **Abandonment of Property 50CFR Ch. 1 27.93**		**X**
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		**X**
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?	**X**	

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 X 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 X **Appropriate** ____

Refuge Manager: Paul L Casey Date: 1-6-09

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: David M Kennedy Date: 1-9-2009

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

603 FW 1
Exhibit 1 page 2 of 2

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Geocaching

Narrative Geocaching is not appropriate since it encourages the unauthorized abandonment of property on the refuge. It also encourages participants to go "off trail" and may impact wildlife during the breeding season.

603 FW 1
Exhibit 1

Finding of Appropriateness of a Refuge Use

Refuge Name: Lake Umbagog National Wildlife Refuge

Use: Field trials 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?	**X**	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)? **Field Trials prohibited by 50 CFR 27.91**		**X**
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	**X**	
(d) Is the use consistent with public safety?	**X**	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?		**X**
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	**X**	
(g) Is the use manageable within available budget and staff?	**X**	
(h) Will this be manageable in the future within existing resources?	**X**	
(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?	**X**	
(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?		**X**

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 X 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 X **Appropriate** ____

Refuge Manager: Paul F. Casey Date: 1-6-09

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: Janet M Kennedy Date: 1-9-2009

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

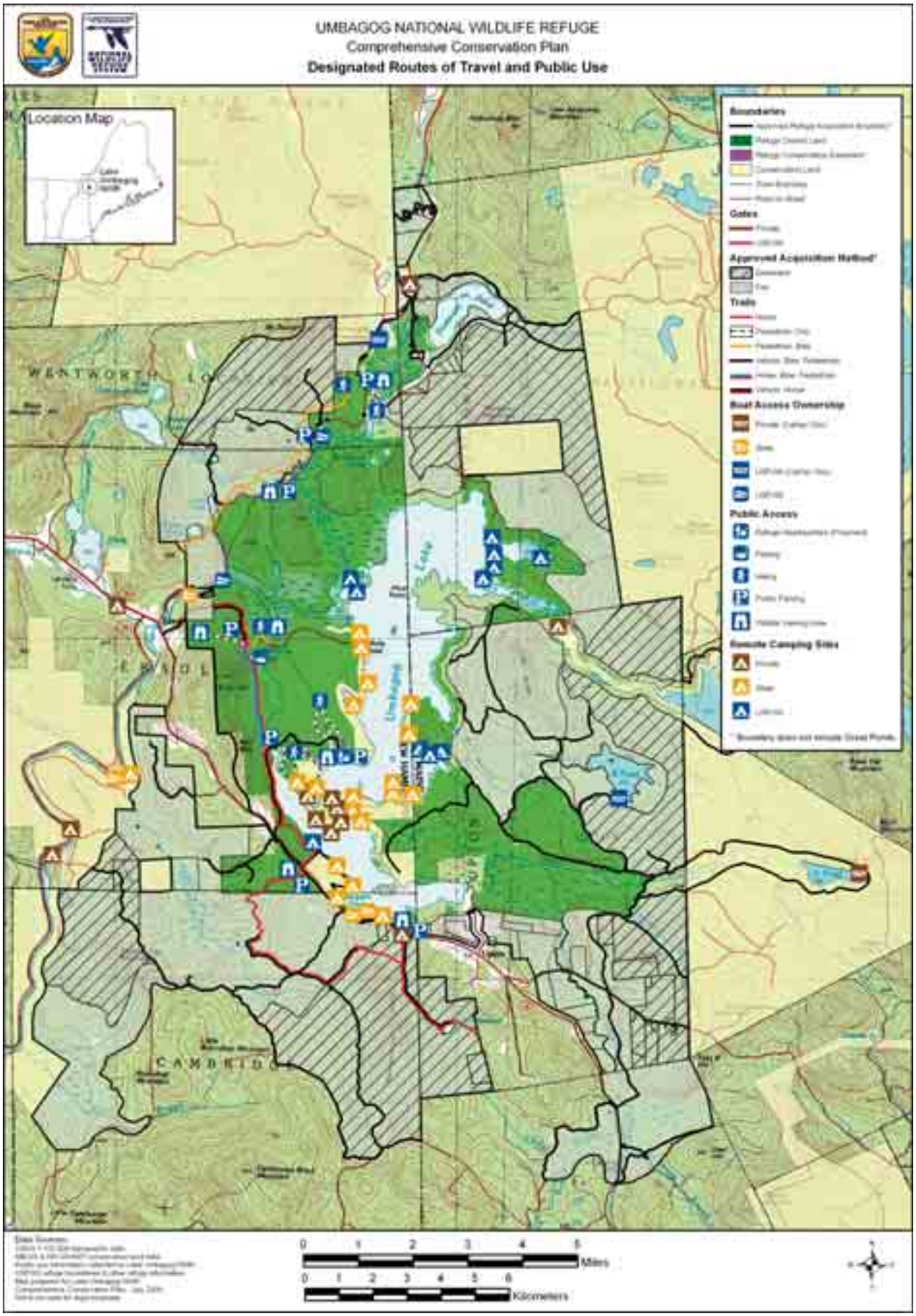
603 FW 1
Exhibit 1 page 2 of 2

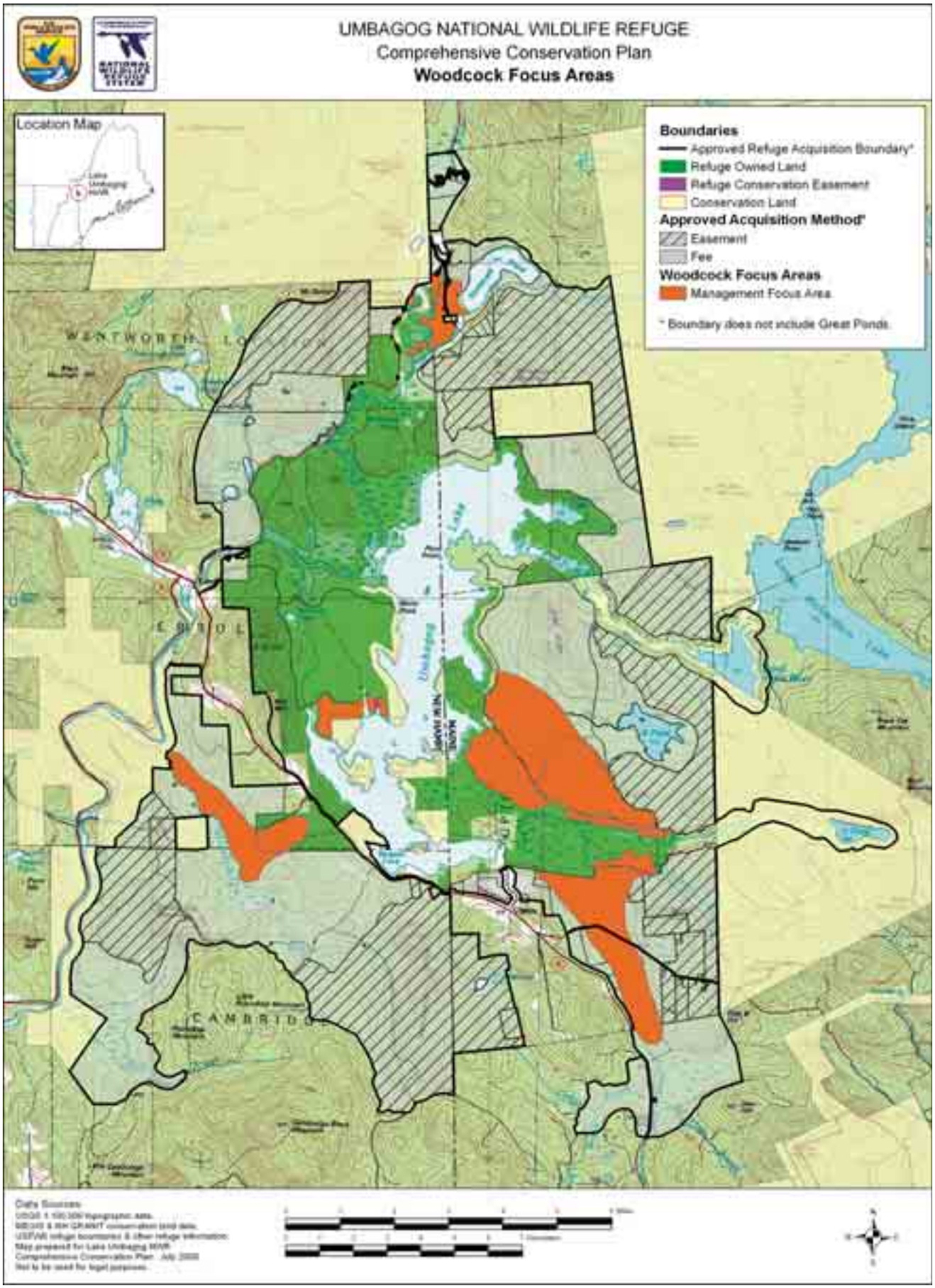
Justification for a Finding of Appropriateness of a Refuge Use

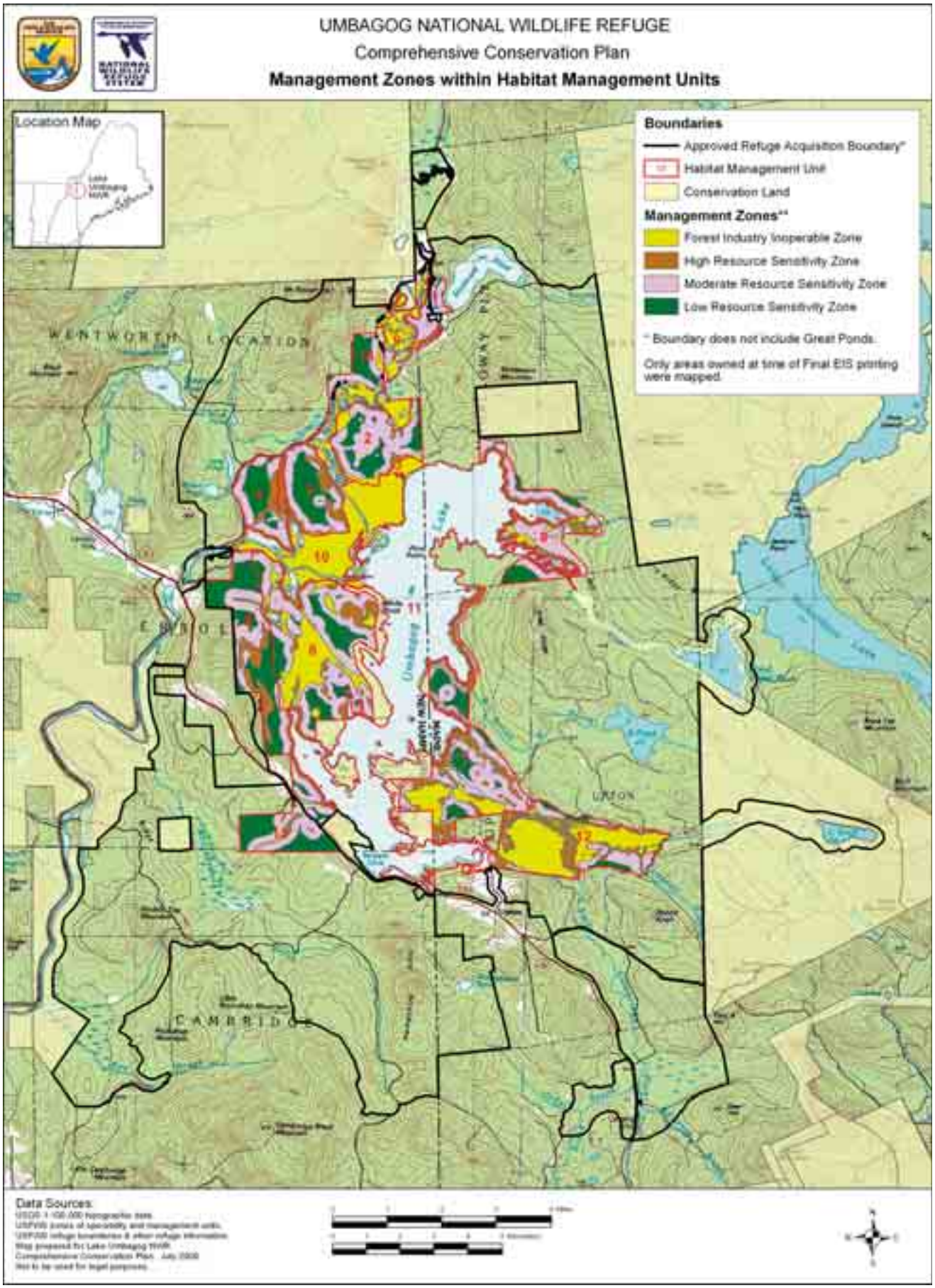
Refuge Name: Lake Umbagog National Wildlife Refuge

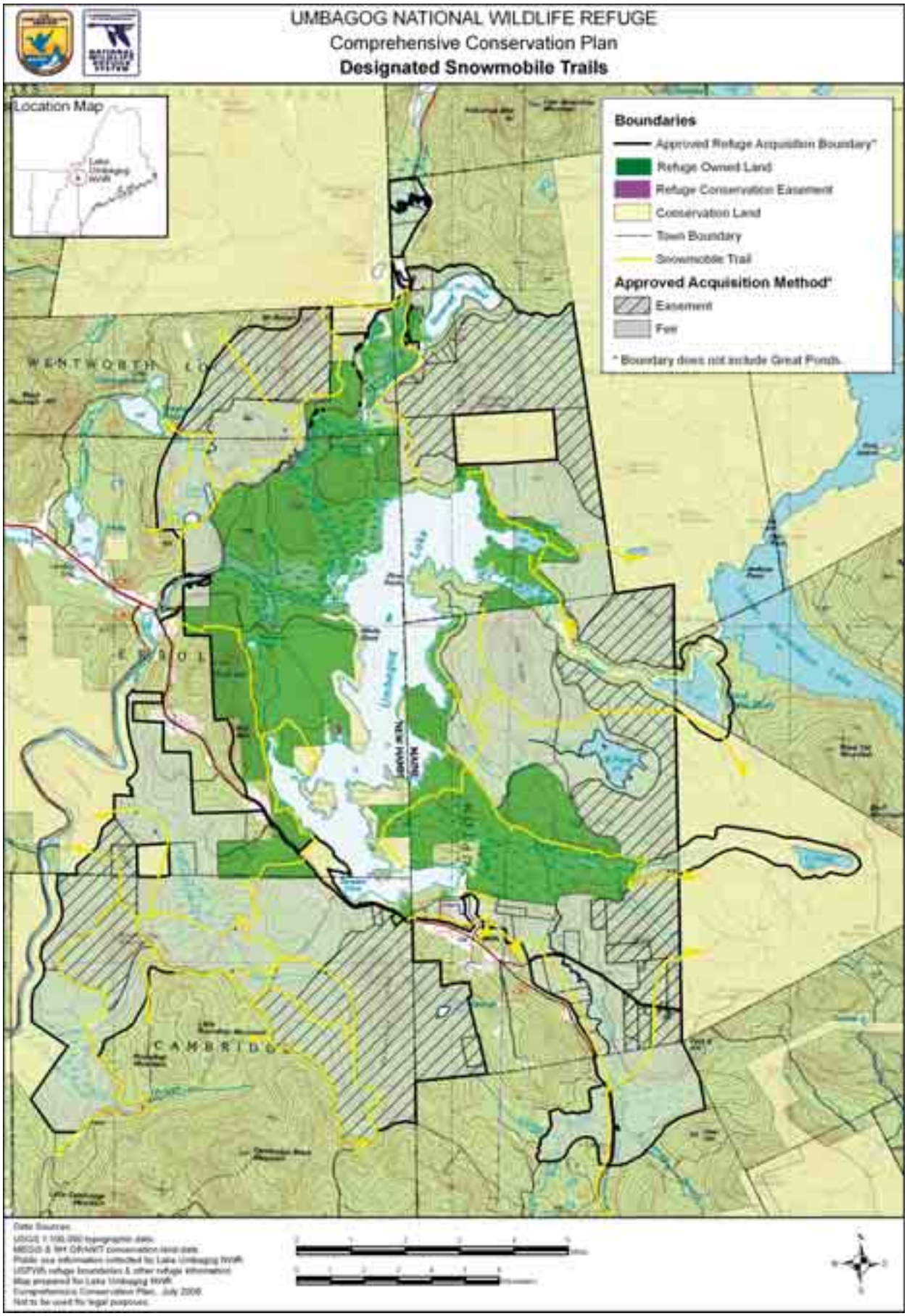
Use: Field Trials for Dogs

Narrative: Field trials typically involve concentrated numbers of participants and spectators which has the potential to disturb wildlife and their habitats. Dog field trials are non-wildlife dependent uses prohibited, as noted, by 50 CFR 27.91.


UMBAGOG NATIONAL WILDLIFE REFUGE
Comprehensive Conservation Plan
Designated Routes of Travel and Public Use
Location Map
Boundaries
Gates
Approved Acquisition Method*
Trails
Boat Access Ownership
Public Access
Remote Camping Sites
WENTWORTH
ERROL
CAMBRIDGE
Umbagog Lake
0 1 2 3 4 5 Miles
0 1 2 3 4 5 6 Kilometers


UMBAGOG NATIONAL WILDLIFE REFUGE
Comprehensive Conservation Plan
Woodcock Focus Areas
Location Map
Boundaries
Approved Refuge Acquisition Boundary*
Refuge Owned Land
Refuge Conservation Easement
Conservation Land
Approved Acquisition Method*
Easement
Fee
Woodcock Focus Areas
Management Focus Area
* Boundary does not include Great Ponds
WENTWORTH
ERROL
CAMBRIDGE
Umbagog
Lake


UMBAGOG NATIONAL WILDLIFE REFUGE
Comprehensive Conservation Plan
Management Zones within Habitat Management Units
Location Map
Boundaries
Approved Refuge Acquisition Boundary*
Habitat Management Unit
Conservation Land
Management Zones**
Forest Industry Inoperable Zone
High Resource Sensitivity Zone
Moderate Resource Sensitivity Zone
Low Resource Sensitivity Zone
* Boundary does not include Great Ponds.
Only areas owned at time of Final EIS printing were mapped.
WENTWORTH LOCATION
UNION
CAMBRIDGE
Data Sources


UMBAGOG NATIONAL WILDLIFE REFUGE
Comprehensive Conservation Plan
Designated Snowmobile Trails
Location Map
Boundaries
Approved Refuge Acquisition Boundary*
Refuge Owned Land
Refuge Conservation Easement
Conservation Land
Town Boundary
Snowmobile Trail
Approved Acquisition Method*
Easement
Fee
* Boundary does not include Great Ponds.
WENTWORTH
ERROL
CAMBRIDGE
Umbagog Lake
NEW HAMPSHIRE
MAINE