Appendix E

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Nulhegan Basin Division, Vermont

Wilderness Review

- 1. Introduction
- 2. Wilderness Inventory
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- 4. Wilderness Study
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1. Introduction

The purpose of a wilderness review is to identify and recommend to Congress, lands and waters of the National Wildlife Refuge System (NWRS) that merit inclusion in the National Wilderness Preservation System (NWPS). Wilderness reviews are required elements of comprehensive conservation plans (CCP), are conducted in accordance with the refuge planning process outlined in the U.S. Fish and Wildlife Service (Service) Manual (602 FW 1 and 3), and include compliance with the National Environmental Policy Act (NEPA) and public involvement.

The wilderness review process has three phases: inventory, study, and recommendation. During the inventory phase, the wilderness review team categorizes lands and waters into Wilderness Inventory Areas (WIAs) and evaluates them to determine if the minimum criteria for wilderness is met. WIAs that meet the minimum criteria are considered Wilderness Study Areas (WSAs) and are further assessed during the wilderness study phase. During the study phase, a range of management alternatives is evaluated to determine if a WSA is suitable for wilderness designation, or whether a WSA should be managed under an alternate set of goals and objectives that do not involve wilderness designation.

During the recommendation phase, the review team decides whether to recommend a WSA to Congress for wilderness designation. If the team decides that any WSAs merit wilderness designation, they report their recommendations to Congress in a wilderness study report. The wilderness study report is prepared after the record of decision for the final CCP has been signed. Areas recommended for designation are managed to maintain wilderness character in accordance with management goals, objectives, and strategies outlined in the final CCP until Congress makes a decision, or the CCP is amended to modify or remove the wilderness proposal.

This wilderness review was produced from an inventory of the refuge's lands and waters. The process involved combining site knowledge with existing land status maps, photographs, available land use information, and road inventory data to determine if refuge lands and waters meet the minimum criteria for wilderness. Geographic Information System (GIS) software was used to conduct spatial and temporal data analysis, which allowed interpretation of such things as habitat conditions, natural communities, cultural features, human footprint, road locations, and other informational needs.

2. Wilderness Inventory

2.1. Introduction

The wilderness inventory is a broad look at each planning area (WIA) to identify potential WSAs. A WSA is an area of undeveloped Federal land that retains its primeval character and influence, without permanent improvements or human habitation, and further, meets the minimum criteria for wilderness as identified in Section 2(c) of the Wilderness Act. This evaluation was performed for all of the refuge's divisions and units on lands owned in fee title.

2.2. Minimum Wilderness Criteria

A WSA is required to be a **roadless** area or an island of any size, meet the **size** criteria, appear **natural**, and provide for **solitude or primitive recreation**.

Roadless: Roadless refers to the absence of improved roads suitable and maintained for public travel by motorized vehicles primarily intended for highway use. A route maintained solely by the passage of vehicles does not constitute a road. Only Federal lands are eligible to be considered for wilderness designation and inclusion within the NWPS.

The following factors were the primary considerations in evaluating the roadless criteria:

- The area does not contain improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use.
- The area is an island, or contains an island, that does not have improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use.
- The area is in Federal fee title ownership.

Size: The size criteria can be satisfied if an area has at least 5,000 acres of contiguous roadless public land, or is sufficiently large that its preservation and use in an unimpaired condition is practicable.

The following factors were the primary considerations in evaluating the size criteria:

- An area of more than 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
- A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features.
- An area of less than 5,000 contiguous Federal acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- An area of less than 5,000 contiguous acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the Forest Service, National Park Service, or Bureau of Land Management.

Naturalness: The Wilderness Act, Section 2(c), defines wilderness as an area that "generally appears to have been affected primarily by the forces of nature with the imprint of human work substantially unnoticeable." The area must appear natural to the average visitor, rather than "pristine." The presence of historic landscape conditions is not required.

An area may include some human impacts provided they are substantially unnoticeable in the unit as a whole. Significant hazards caused by humans, such as the presence of unexploded ordnance from military activity and the physical impacts of refuge management facilities and activities are also considered in evaluating the naturalness criteria.

An area may not be considered unnatural in appearance solely on the basis of the sights and sounds of human impacts and activities outside the boundary of the unit. The cumulative effects of these factors in conjunction with land base size, physiographic and vegetative characteristics were considered in the evaluation of naturalness.

The following factors were the primary considerations in evaluating the naturalness criteria:

- The area appears to have been affected primarily by the forces of nature with the imprint of human work substantially unnoticeable.
- The area may include some human impacts provided they are substantially unnoticeable in the unit as a whole.
- The absence of significant hazards caused by humans, such as unexploded ordnance from military activity.
- The presence of physical impacts of refuge management facilities and activities.

Solitude or Primitive and Unconfined Recreation: A WSA must provide outstanding opportunities for solitude or primitive and unconfined recreation. The area does not have to possess outstanding opportunities for both solitude and primitive and unconfined recreation, and does not need to have outstanding opportunities on every acre. Further, an area does not have to be open to public use and access to qualify under this criteria; Congress has designated a number of wilderness areas in the National Wildlife Refuge System that are closed to public access to protect resource values.

Opportunities for solitude refer to the ability of a visitor to be alone and secluded from other visitors in the area. Primitive and unconfined recreation means non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport. These primitive recreation activities may provide opportunities to experience challenge and risk, self-reliance, and adventure. These two elements are not well defined by the Wilderness Act, but can be expected to occur together in most cases. However, an outstanding opportunity for solitude may be present in an area offering only limited primitive recreation potential. Conversely, an area may be so attractive for recreation use that the ability to experience solitude is compromised.

The following factors were the primary considerations in evaluating the criteria for outstanding opportunities for solitude or primitive unconfined recreation:

- The area offers the opportunity to avoid the sights, sounds and evidence of other people. A visitor to the area should be able to feel alone or isolated.

- The area offers non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport.

Supplemental Values: The Wilderness Act states that an area of wilderness may contain ecological, geological, or other features of scientific, educational, scenic or historical value. Supplemental values of the area are optional, but the degree to which their presence enhances the area's suitability for wilderness designation should be considered. The evaluation should be based on an assessment of the estimated abundance or importance of each of the features.

3. Summary of Wilderness Inventory Findings

The wilderness review team reviewed the eight divisions and eight units (table E.1) within the Silvio O. Conte National Fish and Wildlife Refuge (Conte Refuge) to determine if they met the minimum wilderness criteria stipulated in law and Service policy, and if so, should be further assessed in the Wilderness Study phase of this review. Of the divisions, only Nulhegan Basin and Pondicherry were large enough to meet the minimum size criteria and, therefore, are further evaluated in this review. None of the units met the minimum size criteria; however, the Third Island Unit is a roadless island and is, therefore, further evaluated in this review.

Table E.1. Conte Refuge Divisions and Units

Name*	Location	Class	Acreage
Deadman's Swamp	Connecticut	Unit	31
Roger Tory Petersen	Connecticut	Unit	56
Honeypot Wetlands	Massachusetts	Unit	21
Wissatinnewag	Massachusetts	Unit	21
Mt Tom	Massachusetts	Unit	141
Mt Toby	Massachusetts	Unit	30
Third Island	**Massachusetts**	**Unit**	**4**
Putney Mountain	Vermont	Unit	285
Salmon River	Connecticut	Division	425
Dead Branch	Massachusetts	Division	97
Nulhegan Basin	**Vermont**	**Division**	**26,605**
Fort River	Massachusetts	Division	249
Mill River	Massachusetts	Division	249
Westfield River	Massachusetts	Division	125
Pondicherry	**New Hampshire**	**Division**	**6,405**
Blueberry Swamp	New Hampshire	Division	1,166
Total			**35,910 acres**

* *Note: The refuge divisions and unit listed in* **bold** *meet the size criteria and are evaluated further as to whether they meet other minimum wilderness criteria.*

3.1. Third Island Unit

This island was donated to the Service by the Connecticut River Watershed Council in 1997 and served to formally establish the refuge. It is a 4-acre island in the Connecticut River, in Deerfield, Massachusetts. Third Island is natural in appearance and roadless, but it is small in size and within a quarter mile of numerous roads, houses, and farm fields, thereby precluding the opportunity for solitude and primitive, unconfined recreation. The wilderness review team found that this island does not possess wilderness characteristics and supplemental values that warrant additional evaluation.

Wilderness Inventory Conclusion for Third Island Unit

The wilderness review team did not identify any WIAs on the Third Island Unit and the unit in its entirety does not meet all of the minimum wilderness criteria. We will not evaluate Third Island unit in the Wilderness Study phase of this wilderness review.

3.2. Pondicherry Division

The wilderness review team identified six WIAs that comprise nearly 70 percent of the division (map E.1). Twelve other portions are isolated by roads and are therefore considered roadless, but each is less than 500 acres and will not be further evaluated as a WIA. The WIAs were defined by highways, interior powerline rights-of-way, railroad tracks, and other non-federally owned lands.

All of the WIAs were evaluated to determine if they meet the minimum wilderness criteria and should be further assessed in the wilderness study phase of this review. The wilderness review team found none of the WIAs to be larger than 5,000 acres (table E.2), and given the widespread application of clear-cutting harvests roughly 20 years ago, none of them possess wilderness characteristics and supplemental values that warrant additional evaluation.

Table E.2. Silvio O. Conte National Fish and Wildlife Refuge, Pondicherry Division Wilderness Inventory Areas

Wilderness Inventory Area (WIA)*	Size**
WIA 1	2,269 acres
WIA 2	885 acres
WIA 3	400 acres
WIA 4	209 acres
WIA 5	904 acres
WIA 6	635 acres

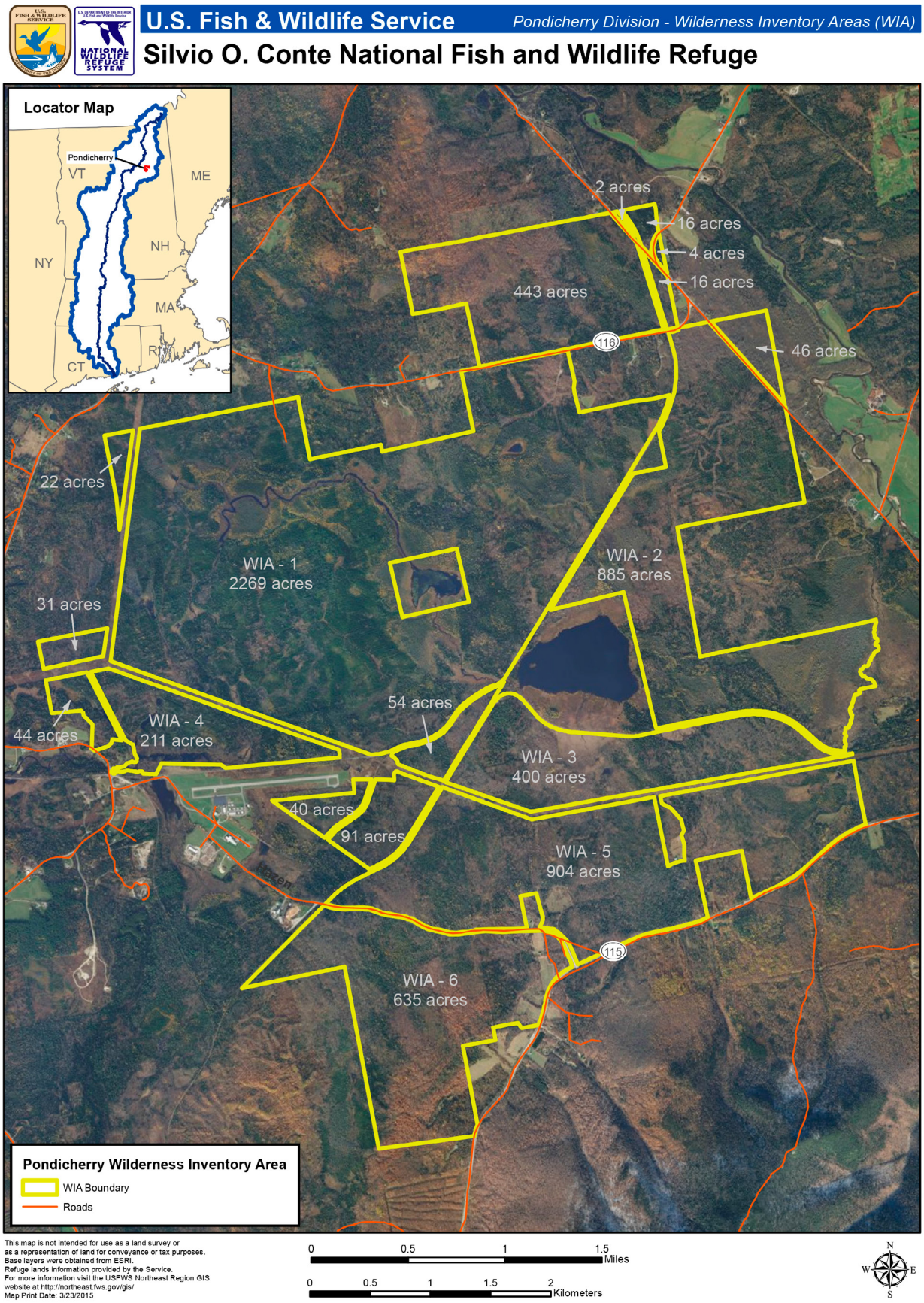
** All Wilderness Inventory Areas are in fee title ownership.*

*** Acreage is approximate.*

Wilderness Inventory Conclusion for Pondicherry Division

The wilderness review team identified six WIAs within the approved acquisition boundary of the division and determined that none of the WIAs meet all of the minimum wilderness criteria. We will not evaluate any of the Pondicherry Division WIAs in the wilderness study phase of this wilderness review.

Map E.1. Wilderness Inventory Areas – Pondicherry Division



This map is not intended for use as a land survey or as a representation of land for conveyance or tax purposes.
Base layers were obtained from ESRI.
Refuge lands information provided by the Service.
For more information visit the USFWS Northeast Region GIS website at http://northeast.fws.gov/gis/
Map Print Date: 3/23/2015

0 0.5 1 1.5 Miles

0 0.5 1 1.5 2 Kilometers

N W E S

3.3. Nulhegan Basin Division

The wilderness review team identified 11 WIAs within the approved acquisition boundary of the Nulhegan Basin Division (division) (map E.2).

The WIAs were primarily defined by the network of existing improved gravel roads on the division. These roads define the extent of parcels that meet the requirements of a roadless area and, therefore, are well suited for use as WIA perimeter boundaries. Alternate road placements, including potential future decommissioning of roads, were evaluated to determine if perimeter boundaries could be altered to increase the size of the WIAs, while maintaining the area as roadless. Such reconfiguration was not possible given the deeded rights-of-way held by neighboring landowners across the following through-roads: Lewis Pond, Lewis Pond Overlook, Tim Carroll Brook, Four Mile, Eagle's Nest, Tin Shack, Canal, and Stone Dam. No alternative road layouts were therefore identified that would meet refuge management or public access objectives, abide by legal access obligations, and result in a WIA becoming eligible as a WSA based on the roadless criteria alone.

All of the WIAs were evaluated to determine if they met the minimum wilderness criteria and should be further assessed in the wilderness study phase of this review. The wilderness review team found one WIA to be larger than 5,000 acres (WIA 4, table E.3) and one WIA that is less than 5,000 acres (WIA 3) yet possesses wilderness characteristics and supplemental values that warrant additional evaluation. While substantially larger than WIA 3, WIA 8 is less than 5,000 acres and lacks naturalness or other associated wilderness values due to extensive logging within the past 20 to 30 years and is not considered further. A narrative description of the two WIAs that warranted further evaluation, WIA 3 and WIA 4, is included below.

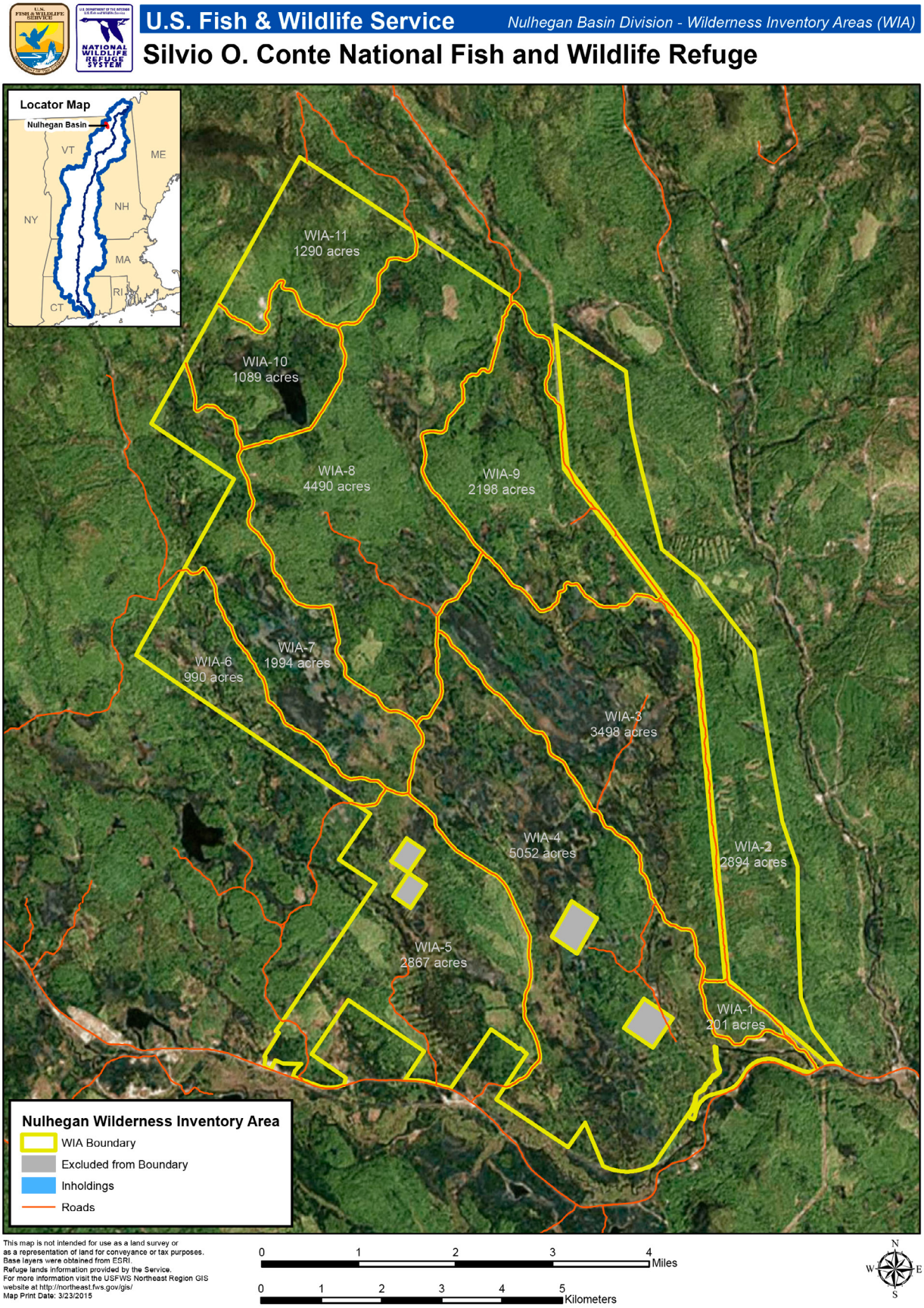
Table E.3. Silvio O. Conte National Fish and Wildlife Refuge, Nulhegan Basin Division Wilderness Inventory Areas

Wilderness Inventory Area (WIA)*	Size**
WIA 1	201 acres
WIA 2	2,894 acres
WIA 3	3,498 acres
WIA 4	5,052 acres
WIA 5	2,867 acres
WIA 6	990 acres
WIA 7	1,994 acres
WIA 8	4,490 acres
WIA 9	2,198 acres
WIA 10	1,089 acres
WIA 11	1,260 acres

** All WIAs are in fee title ownership.*

*** Approximate acreage from GIS listed.*

Map E.2. Wilderness Inventory Areas – Nulhegan Basin Division



Features and characteristics common to both WIA 3 and WIA 4:
Yellow Bogs–The Nulhegan Basin contains an area that is commonly referred to as "Yellow Bogs." Although no formal boundary exists for Yellow Bogs, it is generally accepted as an area characterized by fairly level topography with poor drainage supporting a conifer matrix forest, which is a mix of forested swamps and bogs intermingled among lowland and upland spruce-fir-tamarack forests. A portion of land within both WIAs is considered to be a part of the Yellow Bogs. Yellow Bogs contains a diversity of plants, habitats, and wildlife considered of high ecological value. A variety of species present in this ecosystem have been identified as resources of concern on a number of state and regional plans.

Forest Management–Throughout both WIAs, previous forest management actions are evident in all but the wettest areas. More than a century of forest management has resulted in a vegetative condition that differs markedly from those shaped through natural processes. On heavily managed uplands, age and structural diversity are lacking. Additionally, approximately 3,125 acres (37 percent) of land within the two units is in a successional stage that supports vegetation different from the prescribed natural community. Though not specific to these WIAs, a Conifer Patch Analysis (Lapin and Engstrom 2002) provides a context for the effects of past forest management to the broader forest community. In analyzing the lowland spruce-fir forest within the division, they found that 82 percent was less than 40 years old. Further, they noted that of the forest patches more than 40 years old, only 14 percent constitute "interior forest", as defined by patches separated from adjacent clearcuts by at least 100 meters. Finally, the authors report that "…it is not a gross overgeneralization to say that every acre of lowland spruce-fir forest in the Refuge is younger than 80 years old."

Wind Events–In the wet-mesic matrix forest dominated by conifers, it is common for trees to topple over from wind events. Although more prevalent in the conifer-dominated forest, these "blowdowns" are evident throughout these units and range in size from single trees to much larger areas. Areas that had been selectively harvested appear to have experienced an increase in blowdowns, which can be expected as trees, especially conifers, lose their resilience to such events when adjacent trees are removed.

Cabins–There are several cabins along the perimeter of these WIAs. These cabins predate Service acquisition of the land. Cabin owners lease land owned in fee by the Service. A special use permit (SUP) is issued to cabin owners on a 5-year basis, with an understanding that no SUP will extend beyond 2049. In the meantime, cabin owners may choose to sell their remaining interest to the Service. Any structures acquired will be removed if they are of no future use to refuge management needs and the underlying ground will be allowed to revert to its pre-existing vegetative cover.

Rivers–River systems flow through both WIAs. Within the State of Vermont, rights, ownership, and management of navigable waters are the sole jurisdiction of the State. These are not eligible for wilderness designation but have not been identified as features restricting the bounds of a WIA.

Other features and characteristics in WIA 3:
Acreage: 3,498 acres
Ownership: Fee title

Habitat–Yellow Bogs is an area that has no formal demarcation, but is generally considered to encompass the northeastern quarter of the Nulhegan Basin. Much of the Yellow Bogs—including important natural communities commonly known as Big Swamp and Blowdown Bogs—falls within WIA3. WIA3 is one of the most extensive areas of boreal habitat in Vermont: a large complex of black spruce swamps, alder thickets, sedge meadows, and lowland bogs interspersed within lowland spruce-fir forests. Additionally, large expanses of lowland spruce-fir forest are known to support a great number of species (DeGraaf and Yamasaki 2001). Stands with mature trees support bark-gleaning and cavity-nesting species as trees reach senescence, creating snags and live stems with decay columns within the boles. Black-backed woodpecker is typical in these areas. Hardwood inclusions that arise from periodic disturbances to the main canopy support still more species; red-eyed vireo, for example.

Big Swamp represents an extensive and relatively undisturbed example of lowland black spruce forest—an uncommon community type in Vermont. The swamp has a canopy dominated by black spruce, with lesser amounts of tamarack and balsam fir. The shrub layer is sparse—tall shrubs of mountain holly, withe-rod, and red maple are most common. Habitat characteristics within Big Swamp are thought to support the rare black-backed woodpecker, spruce grouse, gray jay, rusty blackbird, bay-breasted warbler, and possibly Wilson's warbler.

Blowdown Bogs is a diverse area, including some black spruce swamps, a lowland bog, and shrub swamp, all within a matrix of lowland spruce-fir forest. The lowland bog is dominated by black spruce in the canopy,

and in the shrub layer bog-cotton, bog laurel, *Rhodora*, and small cranberry. The shrub swamp is a formerly forested area currently recovering from a large blowdown event. This area also serves as an excellent example of paludification—a process whereby a reduction in evapotranspiration from the loss of a forested canopy leads to an increase in the wetness of a site through a "drawing up" of the water table. This process is common in the moist, cool environment of the subarctic, but is extremely rare in Vermont. Blowdown Bogs provides important habitat characteristics for rare boreal birds, and a rare boreal plant—mountain cranberry.

These unique areas within WIA 3 sit within a matrix of lowland spruce-fir forest, with a significant portion having been harvested in the recent past (Lapin and Engstrom 2002). While this matrix forest is not unique per se, it serves as an important buffer to the unique communities discussed above.

Natural Communities/Naturalness–Approximately 1,036 acres (30 percent) of land within this unit support vegetation that is significantly different than the natural community of the area in which it occurs. WIA 3 has lands that have been managed intensively for forest products and appear so, and lands that were not managed intensively, if at all, within the past 100 years. We used tree height and canopy closure as indicators of perceived "naturalness", although greater heights and a larger percentage of closure are not necessarily indicative of natural or mature forest conditions. In evaluating the mix of forest conditions, three areas within WIA 3 were identified as having characteristics that could appear as natural to the general public. Collectively these three areas account for approximately 55 percent of WIA 3.

Roads–Peanut Dam Road extends approximately 1.3 miles from Stone Dam Road into the unit. This is a gravel road that was constructed by the previous owners for timber extraction, and has been maintained to minimum standards (i.e., passable by vehicles but with no grading, gravel additions, etc.) by the Service since acquisition. In addition, this WIA contains approximately 4.8 miles of "winter" road, consisting of an unimproved cleared alignment used for hauling wood products. While not having been used for more than a decade, these winter roads are still clearly identifiable in recent aerial photographs and may influence a person's perception of "naturalness". It is also likely that many of these roads would be used by the Service to accomplish future habitat management projects.

Cabins–Six privately owned cabins are within this unit.

Gravel Pit–One site exists where gravel has been extracted, probably for use in building or maintaining roads. The total area of this site is approximately one acre.

Other features and characteristics in WIA 4:
Acreage: 5,052 acres
Ownership: Fee title

Inholdings–WIA 4 is the largest contiguous parcel of land within the division. The WIA contains two in-holdings that are not owned by the Service and therefore they will not be further studied in this review. Their acreages have not been included in the WIA acreage calculation.

Habitat–Upland areas support a mix of conifer and hardwood, as well as hardwood dominant forests in the more southern portions, and especially as the land rises from the Yellow Branch to the eastern and western expanses of the unit. Regeneration is occurring within "skid roads" that were used for timber extraction that occurred prior to Service acquisition. These roads are no longer used for machinery access by the Service, but are still present and easily distinguished.

Yellow Bogs–A large portion of the northern and central regions of this unit, as well as wetlands found along the river corridor of the Yellow Branch, are a part of Yellow Bogs. This portion of Yellow Bogs is primarily drained by the Yellow Branch of the Nulhegan River, which has its headwaters to the north on an adjacent WIA, but the majority of which meanders through WIA 4. The portion of the Yellow Branch that is within this unit is considered a navigable waterway, and therefore is owned and managed by the State of Vermont.

Natural Communities/Naturalness–Approximately 2,089 acres (41 percent) of land within this unit support vegetation that is significantly different than the natural community of the area in which it occurs. WIA 4 has lands that have been managed intensively for forest products and appear so, and lands that were not managed intensively, if at all, within the past 100 years. We used tree height and canopy closure as indicators of perceived "naturalness", although greater heights and a larger percentage of closure are not necessarily indicative of natural or mature forest conditions. In evaluating the mix of forest conditions, four areas within WIA 4 were

identified as having characteristics that could appear as natural to the general public. Collectively these four areas account for approximately 42 percent of WIA 4.

Roads–Black Branch road extends approximately 2.3 miles from Stone Dam Road into the unit. This is a gravel road that was constructed by the previous owners for timber extraction, and has been maintained to minimum standards (i.e., passable by vehicles but with no grading, gravel additions, etc.) by the Service since acquisition. In addition, this WIA contains approximately 4.9 miles of "winter" road, consisting of an unimproved cleared alignment used for hauling wood products. While not having been used for more than a decade, these winter roads are still clearly identifiable in recent aerial photographs and may influence a person's perception of "naturalness". It is also likely that many of these roads would be used by the Service to accomplish future habitat management projects.

Cabins–Five privately owned cabins are within this unit.

Gravel Pits–Two sites exist where gravel has been extracted for use in building or maintaining roads. The total area of these sites approximates 2.8 acres.

Wilderness Inventory Conclusion for Nulhegan Basin Division
The wilderness review team identified eleven WIAs within the approved acquisition boundary of the division and determined that none of the WIAs meet all of the minimum wilderness criteria. However, because of their unique characteristics, WIA 3 and WIA 4 should be further evaluated. WIA 3 and 4 are within the approved acquisition boundary of the division and are owned in fee by the Service.

WIA 3 does not meet the roadless or size criteria but has components that may appear natural to the general public and provides the opportunity for solitude or primitive recreation. Peanut Dam Road is within this WIA and would have to be decommissioned in order to be considered roadless.

WIA 4 does not meet the roadless criterion but does meet the size criterion, has components that may appear natural to the general public, and provides for solitude or primitive recreation. Black Branch Road is within this WIA and would have to be decommissioned in order to be considered roadless.
WIAs 3 and 4 are comprised of undeveloped Federal lands, a portion of which retain their primeval character and influence, without permanent improvements or permanent human habitation. Collectively, they span a significant portion of a conifer matrix forest ecosystem, which possesses high ecological value. Additionally, these WIAs contain an approximately 6-mile common border, divided by a single-lane gravel road subject to a deeded right-of-way. Although the presence of this road precludes a wilderness area from being considered roadless, the juxtaposition of habitat provides a high degree of ecological and wildlife habitat connectivity.

We will evaluate WIA 3 and WIA 4 as WSAs in the wilderness study phase of this wilderness review. In the study phase, we will evaluate a range of management alternatives to determine if WSA 3 or 4 are suited for wilderness designation, or are suited for management under an alternate set of goals and objectives that do not involve wilderness designation.

4. Wilderness Study

4.1. Nulhegan Basin Division

WSA 3 and WSA 4 were found to possess wilderness characteristics defined by the Wilderness Act. In the wilderness study, we further evaluate these WSAs to determine their suitability for management, preservation, and designation as wilderness. Considerations in this evaluation included:

- Quality of wilderness values.
- Evaluation of resource values, public uses, and associated management concerns.
- Capability for management as wilderness.

This information provides a basis to compare the impacts of a range of management alternatives and determine the most appropriate management direction for each WSA.

Evaluation of Wilderness Values
This section evaluates the quality of the WSAs' mandatory and supplemental wilderness characteristics.

Roadless: Both WSA 3 and WSA 4 contain a combined 13 miles of both gravel and winter roads within their perimeter bounds. These roads were built by previous owners and while the gravel roads have been maintained

by the Service for administrative purposes and public access, the winter roads have not been maintained, yet are still clearly distinguishable in current aerial photography. In order for these WSAs to qualify as roadless, the gravel roads will need to be decommissioned and either removed or allowed to naturally return to a forested condition, while in the absence of active use, the winter roads will continue to re-vegetate over time and may be mostly obscured in the next few decades.

Naturalness: Although sharing a history of extensive logging, both of the WSAs contain discrete areas that provide a sense of naturalness and generally appear to have been affected primarily by the forces of nature, with the imprint of human work substantially unnoticeable. These areas are comprised of predominately forested and non-forested wetlands, which provide an environment with natural character. These wetlands occur in irregular shapes that with one exception are well less than one-mile square. In WSA 3, the wetlands are located in closer proximity to each other and therefore collectively they provide a larger, more expansive area with a natural appearance. The wetlands within WSA 4 are more isolated, creating a less notable natural appearance. The adjoining upland areas present throughout both WSAs have been subject to intensive forest management. In these upland areas, it is obvious that forest manipulation has occurred, thus reducing the naturalness of the corresponding landscape. These areas are regenerating naturally and therefore are now being shaped by natural forces. However, it will take hundreds of years before evidence of human intervention is less apparent.

The majority of the topography has been unaltered, with the exceptions being the gravel pits, skid roads, and a few log landings. The small, isolated cabins and gravel spur roads have been identified as features that impact the sense of naturalness.

Outstanding Opportunities for Solitude or Primitive Recreation: Both WSAs provide opportunities for solitude or primitive recreation. The WSAs are in remote areas that are more than 70 miles from a major airport and more than 20 air-miles from an interstate highway, although the most pristine forest elements generally share a substantial border with gravel roads and/or the 450 kV transmission line corridor. The transmission line, with poles in excess of 80 feet in height, forms the eastern boundary of WSA 3. This transmission line is visible from WSA 3 and, therefore, will likely have some visual impact that may reduce the overall sense of solitude and opportunity for primitive recreation. However, the relatively level topography and dense vegetation will serve to mask its presence.

Quality of Supplemental Values: Both of the WSAs offer excellent ecological values with features of scientific, educational, and scenic interest. The peat lands and forested wetlands have been relatively unaltered by human intervention and therefore offer a unique opportunity to observe or study habitats that have been primarily shaped by natural processes. These areas also contain a variety of plants that are rare in the State of Vermont, including one of the rarest plants in the State, lingonberry (*Vaccinium vitis-idaea*). The Nulhegan Basin is rich in Native American and modern American history, although most is obscured by the dense forest vegetation within the WSAs, with the exception of the more recent forest management activities. The exception to this is the evidence of historic log-drive dams that existed in the Black Branch of the Nulhegan River, within the perimeter of WSA 3. In addition, the results of an ecological assessment of the Nulhegan Basin indicate (Lapin and Engstrom 2002) :

- "The Nulhegan Basin is a landform of a unique large size, geologic history, and natural community mosaic. The forest and wetland vegetation have boreal affinities and the landscape thus may be considered to be one of a handful of large, lowland southern extensions of boreal vegetation types."

- "Conserved areas in Maine and New York are similar to the Nulhegan Basin in several, but not all, ecological parameters (specifically, natural community and floristic composition, soils, and hydrology in various combinations at the different sites). The Maine and New York sites are located approximately 300 miles apart, and the Nulhegan Basin sits practically midway between."

- "The Nulhegan Basin is a landscape of a scale similar to few lowland spruce-fir landscapes in any geologic landform from Maine to New York; thus, it provides one of the few opportunities for landscape-scale, lowland spruce-fir forest conservation in the northeastern United States."

- "The Nulhegan Basin is one of the southernmost lowland spruce-fir landscapes, and thus provides habitat for a variety of northern organisms that are of conservation concern in the region (particularly forest birds and some plants). As such, the area also has implications for providing corridor, stepping stone, or refugium functions with regard to global climate change."

Evaluation of Manageability and Other Resource Values and Uses: Neither of these WSAs can be managed as a wilderness without making some exceptions. Both of the WSAs contain privately owned and maintained recreational cabins on their periphery. These cabins are on leased lots that are owned in fee by the Service, and leased to camp owners - use of the cabins may extend until 2049 at the owner's discretion. While the Service has a standing offer to purchase cabins from willing sellers, it should be assumed for the purposes of this review that the cabins will remain until 2049. Until that date, cabin owners are granted legal use and access of their cabins and an associated one-acre plot of land.
Rivers—Rivers flow through both WSAs. The State of Vermont retains rights and ownership of public waters defined as "navigable", and the lands lying thereunder. Although these non-Federal lands are not eligible for wilderness designation, they have not been identified as features that restrict the bounds of a WSA. Although they are assumed to be negligible at the WSA-scale, accurate acreages have not been calculated for the riverine portions of the WSAs, and therefore have not been removed from the WIA or WSA acreage.

Inholdings—Two parcels totaling approximately 167 acres are within the perimeter bounds of WSA 4 (map E.2) and have been deducted from the acreage total. These lots are owned in fee by private and municipal interests. The owners of these lands retain certain "unwritten and unrecorded ingress and egress rights." The 84-acre lot falls within the Refuge acquisition boundary; the 83-acre lot does not.

Deer Wintering Area—The largest "deer wintering area" in the State of Vermont is within the Nulhegan Basin area. The majority of this historic wintering area is on the division (approximately 10,000 acres) and encompasses all of WSA 4 and most of WSA 3. In this northern region, wintering areas are critical for the survival of white-tailed deer. Furthermore, the multi-aged, dense canopy forest conditions desired for wintering deer benefit additional wildlife species of concern and contribute to broader ecological goals. Past forest management has significantly reduced the amount of functional shelter currently available within this area, disrupting the desired condition. Rehabilitation efforts utilizing mechanized equipment will be necessary to encourage a multi-aged forest that would more quickly develop into and sustain the desired habitat condition for wintering deer and a variety of other wildlife species associated with these habitat conditions.

American Woodcock—Woodcock Habitat Management Demonstration Areas exist within both WSA 3 and WSA 4. These areas comprise approximately 134 acres of WSA 3 and 32 acres of WSA 4. These locations have been selected because they contain features that are highly suitable for woodcock habitat management and provide access to exhibit such treatments to potential practitioners. These areas contribute to the Northern Forest Woodcock Initiative (NFWI), of which the Service is a partner. The NFWI is a landscape-level conservation approach that is dependent on private and public involvement. NFWI was developed to address the rapid decline in woodcock populations. The division was identified as one of the most suitable public land areas for woodcock management in Bird Conservation Region 14 (BCR 14). This presents opportunities for the division to contribute to the recovery efforts of the NFWI and to the goals of national plans identifying woodcock as a priority species of concern. One of the goals of the NFWI is to establish woodcock demonstration areas to provide examples of proper woodcock management and to provide research and monitoring opportunities. Creating such demonstration areas on the division also provides the opportunity for public education and interpretation, and thus will further contribute to the Service's goals and the Conte Refuge's purposes. The Service has committed to actively managing these areas for the purposes intended until it is determined they are no longer critical to meet the goals of the NFWI. Employing mechanized equipment that shreds or removes trees will be necessary at five to seven year intervals in order to provide the stages of dense and shrubby early successional habitat required by woodcock to successfully complete their lifecycle. Additional information regarding the locations, goals, objectives, and strategies for each demonstration area may be found in the Woodcock Habitat Management Plan (USFWS 2009).

Motorized Vehicles—Most of the perimeter bounds of the WSAs are division roads (and a private powerline road) that are open to the public. These roads are open to motorized vehicles throughout the year, except when the roads are not passable due to muddy conditions which typically occur during April and May. Snowmobiles are the only motorized vehicles allowed during the winter season and are restricted to a network of trails that primarily overlay gravel roads; encompassing approximately 33 of the division's roughly 40 miles of gravel roads. The trails are maintained by the Vermont Association of Snow Travelers (VAST) through a SUP. Each year, the division receives approximately 2,000 wheeled vehicle visits and 8,000-12,000 snowmobile visits, depending on snow conditions. Sound from wheeled vehicles dissipates within a short distance, while the basin's topography tends to project snowmobile sounds. This may adversely affect "wilderness character" during winter and necessitate an evaluation of potential changes to the snowmobile trail network.

Powerline Corridor–The eastern boundary of WSA 3 is a privately owned powerline corridor. This corridor is 200 feet in width and is owned and managed by the Vermont Electric Power Company (VELCO). An access road extends the length of the corridor and is open to public travel. Wheeled motorized vehicles and snowmobiles are allowed and the season and mode of use are typically managed similarly with the division. Motorized vehicles on the division, as well as the powerline road, are restricted to registered vehicles that can be legally operated on public highways. All-terrain vehicles (ATV) and other motorized vehicles such as dirt bikes and all-terrain cycles are not permitted on the division or on the powerline road.

Development of CCP Alternatives
After evaluating the quality of wilderness values, manageability, and other resource values and uses, and reviewing public comments during the scoping phase, the following action alternatives were developed and analyzed in the accompanying draft CCP/EIS for Conte Refuge:

Alternative C (Service's Preferred Alternative): Under this alternative, neither of the WSAs (0 acres) would be recommended for wilderness designation. Both WSAs would be managed to accomplish habitat management objectives for priority wildlife species as described in the draft CCP/EIS. More specifically, habitat management would follow the actions described in a future Habitat Management Plan. In general, both passive and active management would be used to attain an adequate diversity and distribution of age classes with an emphasis on rehabilitating natural communities and a naturally sustainable multi-aged forest. Once goals have been met in terms of rehabilitating natural communities and age-class distributions, it is recommended that another wilderness review be completed.

The forests in both WSAs have been subject to intensive forest management resulting in predominately even-aged characteristics that lack aspects of the biological diversity and ecological integrity important to Federal trust resources and other species and habitats of conservation concern to the Service. It would take hundreds, if not thousands of years, for a forest to develop naturally the multi-aged, biologically diverse characteristics that contribute to a healthy and sustainable ecosystem. However, research has demonstrated that the thoughtful application of uneven-aged management techniques will encourage multi-aged forests, comprised of native species growing on appropriate natural community sites, to develop at a much faster rate than through sole reliance on natural processes/disturbances (Schütz 2002, Seymour et al. 2002, Keeton 2004, Franklin et al. 2005). Therefore, the wilderness review team concluded at this time that the potential use of active management in both WSAs is critical to achieving habitat goals and objectives in a timely manner. Furthermore, the team concludes that once conditions that lend themselves well to natural sustainability have been restored, another wilderness review should be conducted. It is likely that the beginning stages of naturally sustainable forest conditions could occur within the next 30 to 50 years.

Alternative D (Propose Unit 3 and Unit 4 as Wilderness with Exceptions): Under this alternative, both WSA 3 and WSA 4 would be recommended for wilderness designation with exceptions that include cabin SUPs, access rights to private landowners, and decommissioning and reforestation of interior roads and gravel pits. Additionally, waterways that are owned by the State of Vermont are not eligible for wilderness designation and therefore are not included under this alternative.

The recreational cabin program would be administered consistent with current practices (i.e., use and maintenance of cabins would continue as prescribed in the existing SUP, and SUPs would not be renewed beyond 2049). When feasible, lands and cabins within the WSAs would be purchased from willing sellers. Once cabins were acquired by the Service, they would be dismantled and removed, and the site would be restored to a natural condition.

Access rights to landowners, both interior and adjacent to the division, as well as cabin owners would continue to be allowed as specified in any and all legal documents, and more specifically, in accordance with the deeds that are held by adjacent landowners wherein roadway rights-of-way are considered at a width of 66 feet.

Roads that currently exist as spur roads into the WSAs, namely Peanut Dam Road and Black Branch Road, which have been maintained for administrative and public access purposes, would be decommissioned and the use of machinery and other mechanized equipment would be used, if warranted, to restore road beds to conditions that facilitate natural hydrologic flows or other natural conditions, as advised through future environmental assessments. Gravel pits that lie within the WSAs would also be subject to the use of machinery and other mechanized equipment for restoration and habitat rehabilitation purposes.

The WSA boundaries would be defined by the gravel roads that surround the WSAs, namely Lewis Pond, Eagle's Nest, Canal, Stone Dam, and Tin Shack Roads, and all private lands and rights-of-way. The width of the gravel roads is considered 66 feet as defined by the deeds held by adjacent landowners.

Because Congress has reserved the authority to make final decisions on wilderness designation, the wilderness recommendations are preliminary administrative determinations that will receive further review and possible modification by the Service Director, the Secretary of the Interior, or the President. However, the analysis of the environmental consequences of this alternative in chapter 5 of the draft CCP/EIS is based on the assumption that Congress would accept the recommendation and designate both WSAs as wilderness.

If both WSAs are designated as wilderness, they would be managed according to the provisions of the Wilderness Act and Service wilderness management regulations (50 CFR 35) and wilderness management policy in the Refuge Manual (6 RM 8). The areas would be managed to accomplish refuge purposes and the NWRS mission, while also preserving wilderness character and natural values for future generations. Use of motorized vehicles, motorized equipment, and mechanical transport may be allowed for emergency purposes and when necessary to meet minimum requirements for the administration of the area as wilderness and to accomplish refuge purposes. Proposed or new Nulhegan Basin Division management activities, or division uses would be evaluated through a minimum requirements analysis and NEPA compliance to assess potential impacts and identify mitigating measures to protect wilderness character.

5. Alternatives Considered but Eliminated from Consideration

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). It was determined that there was no benefit in analyzing partial wilderness alternatives for individual WSAs. There are no feasible or practical boundary adjustments that would improve the manageability of an individual WSA. Additionally, it is not feasible to recommend wilderness without providing exceptions for cabin usage and deeded rights-of-way.

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