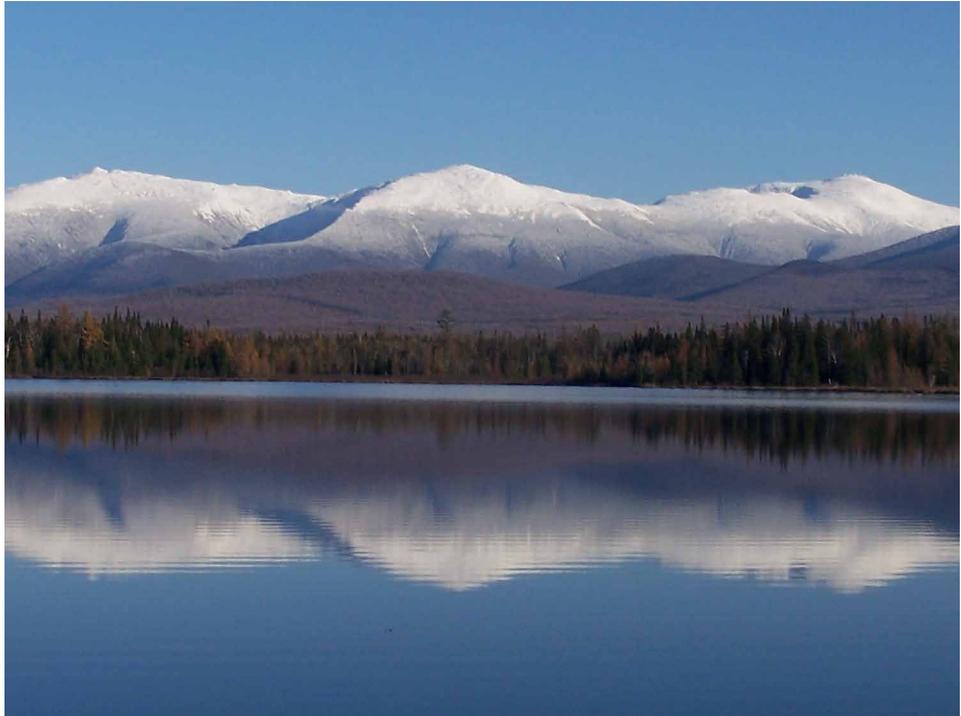


New Hampshire



Dave Govatski

Cherry Pond from the Pondicherry Division, New Hampshire

State of New Hampshire

- **Ashuelot River Conservation Focus Area (Proposed)**
- **Blueberry Swamp Conservation Focus Area (Existing Refuge Division)**
- **Mascoma River Conservation Focus Area (Proposed)**
- **Pondicherry Conservation Focus Area (Existing Refuge Division)**
- **Sprague Brook Conservation Focus Area (Proposed)**

Overview Ashuelot River Conservation Focus Area (Proposed) Alstead, Marlow, Surry, and Gilsum, New Hampshire

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	17,753	84.2%
<ul style="list-style-type: none"> ■ Existing Refuge Ownership in CFA¹ ■ Additional Acres in CFA proposed for Refuge Acquisition² 	0 17,753	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	3,332	15.8%
Total Acres in CFA ^{2,4}	21,085	100 %

¹Acres from Service’s Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data);

⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The proposed Ashuelot CFA is part of a larger area identified as a high priority for conservation for the State of New Hampshire because it contains a large intact forested area with small, scattered, high-quality forested wetlands that are valuable, especially for black duck nesting. The CFA also encompasses a tremendous diversity of topography (e.g., elevation and aspects). Service land acquisition in this CFA could serve as a footing between other nearby conserved areas.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 85.7%
- Shrub swamp and Floodplain Forest – 2.3%
- Freshwater Marsh – 1.3%

For more information on habitats in the CFA, see map A.43 and table A.31.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.32 below, there are ten priority refuge resources of concern (PRRC) terrestrial and aquatic species, including a federal listed species that rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) including wetland dependent and forest interior species. These species and others are discussed further below.

1. Federal Threatened and Endangered Species

The Ashuelot River, below Surry Mountain Lake, supports the federally endangered dwarf wedgemussel. This species requires stable bank conditions and good water quality (U.S. Fish and Wildlife Service 1993, Nedeau et al. 2000). The Ashuelot River is one of two rivers in the upper watershed where significant numbers of mussels have been found. Habitat loss, fragmentation and altered river processes are threats impeding the recovery of dwarf wedge mussel in the upper Connecticut River (Nedeau 2009).

American eel, a species petitioned for Federal listing also occurs in the Ashuelot CFA. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit the CFA streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Ashuelot CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat for a diversity bird species.

The New Hampshire Chapter of The Nature Conservancy (TNC) identified the Surry Mountain area as one of 13 high priority habitat areas in the Ashuelot River watershed. These areas were identified due to their ecological diversity and unfragmented landscape (Zankel 2004). To better understand the biological diversity within the Surry Mountain area, TNC initiated the collection of baseline bird and habitat data. The intact forest and wetland ecosystems provide habitat for a diversity of bird species from aquatic and wetland-dependent birds to those that use large, unfragmented forests.

A total of 68 documented bird species use the habitats identified in the Ashuelot CFA. These include PRRC species such as blackburnian warbler, Canada warbler, chestnut-sided warbler, wood thrush, bald eagle, and American woodcock. Wood thrush and blackburnian warbler prefer older forests, while American woodcock and chestnut-sided warbler rely on young forests within the CFA. Canada warbler prefers the moist soils and structural diversity of forested wetlands and riparian areas. SGCN species were also observed during surveys including common loon, American bittern, great blue heron, Virginia rail, veery, and eastern towhee.

3. Waterfowl

Wetlands within the CFA, especially those associated with Surry Mountain Lake, provide habitat for breeding and migrating species such as blue-winged teal, hooded merganser, common merganser, and wood duck. These wetlands may also provide provide quality breeding, foraging, and stopover habitat for American black duck, a species of high conservation concern and PRRC.

4. Diadromous fish and other aquatic species

The Ashuelot River CFA supports numerous pond, wetland and river habitats. A portion of the Ashuelot River (from Village Pond to Surry Mountain Lake) meanders through the hilly terrain of the CFA. The main stem and tributaries provide habitat for American eel, and possibly Eastern brook trout. Both species are PRRC, though a species inventory will be necessary to confirm brook trout presence.

Surry Mountain Lake is located in the southern portion of the CFA. This manmade lake is associated with the Surry Mountain Dam, which was built on the Ashuelot River in 1941 by the U.S. Army Corps of Engineers to prevent flooding along the Connecticut River. This 265-acre lake is managed by New Hampshire Fish and Game Department and the Army Corps of Engineers, and supports various species of bass, crappie, walleye, and lake trout.

5. Wetlands

Over six percent of the Ashuelot CFA is wetland habitat with a high percent of these acres forested wetlands. A large wetland complex occurs on the north end of Surry Mountain Lake. This complex contains a mix of shrub swamps and floodplain forest, hardwood swamp and freshwater marsh. According to The Nature Conservancy, the floodplain forest that occurs in this CFA is the only significant floodplain in NH that is dominated by white swamp oak. This species is rare in NH, making this habitat ecologically important (Marks et al 2011). Other wetland habitats in patches of variable size are scattered throughout the CFA.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and native species will dominate. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also conduct habitat management in wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and clear aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

Does the proposed CFA have special ecological, cultural, or recreational features or designations of regional, State, or local importance?

Surry Mountain Area was also identified by The New Hampshire Chapter of TNC as one of 13 high priority habitat areas in the Ashuelot watershed due to its ecological diversity and unfragmented landscape.

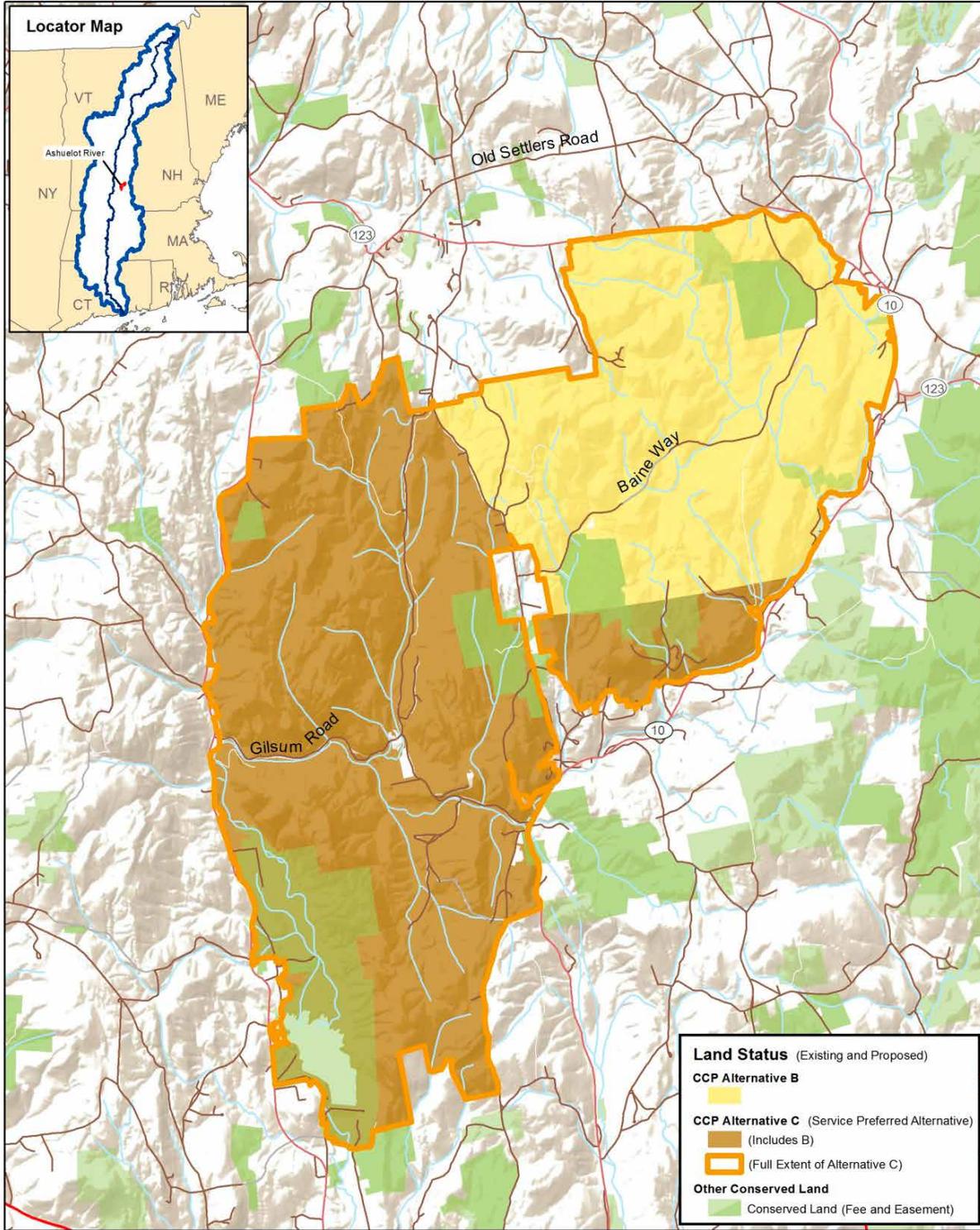
Map A.42. Ashuelot CFA – Location.



U.S. Fish & Wildlife Service

Ashuelot River CFA under CCP Alternative C

Silvio O. Conte National Fish and Wildlife Refuge



Land Status (Existing and Proposed)

CCP Alternative B

CCP Alternative C (Service Preferred Alternative)

(Includes B)

(Full Extent of Alternative C)

Other Conserved Land

Conserved Land (Fee and Easement)

This map is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. The conserved lands layer (2012) was obtained from Trust for Public Land. Other 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: 3/18/2015



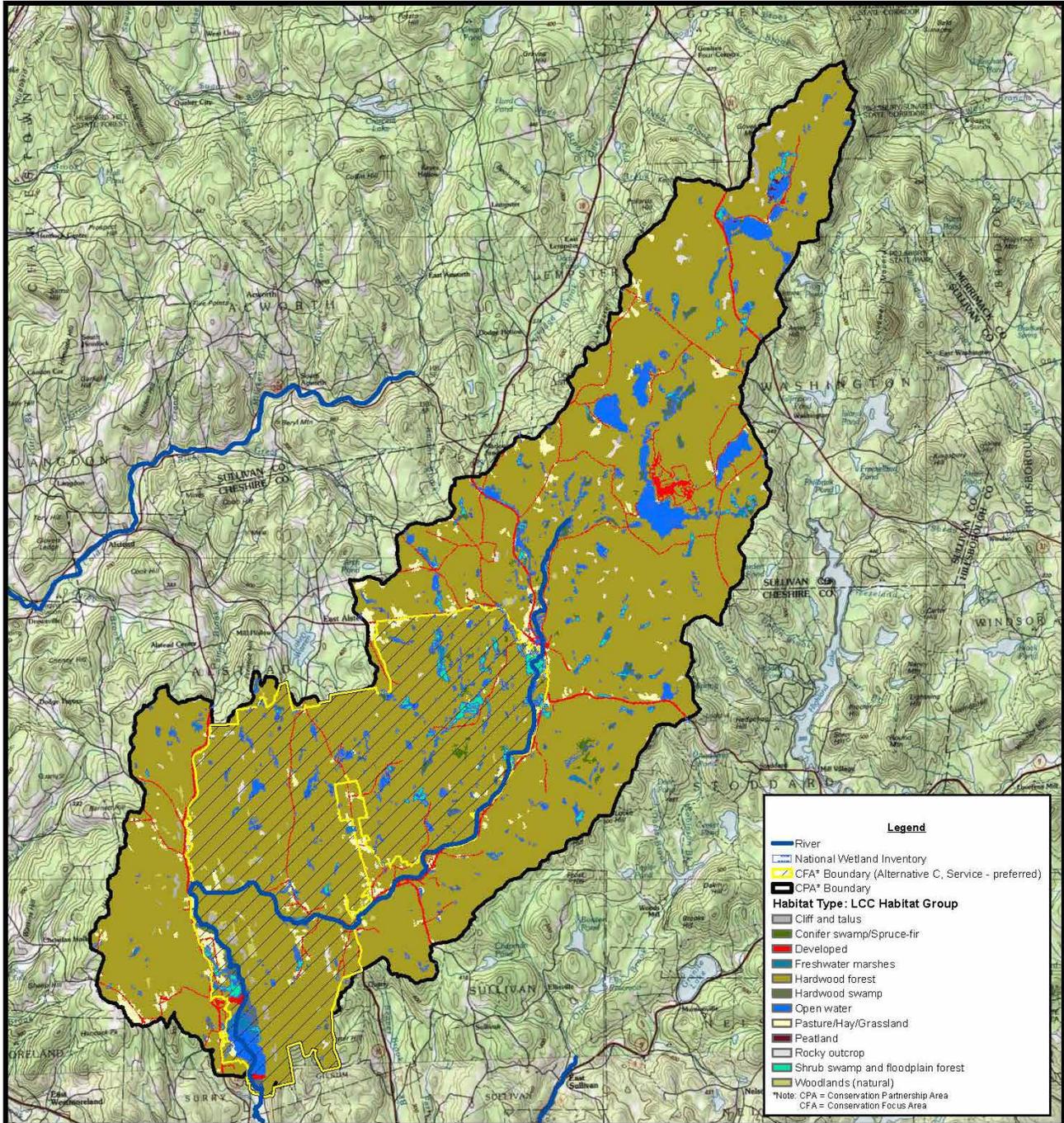
Map A.43. Ashuelot CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Ashuelot River CPA* - NH

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management. It is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. For more information visit the USFWS Northeast Region GIS website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013

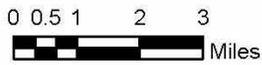


Table A.31. Ashuelot CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands⁹							
Conifer swamp/spruce-fir	914	1.4%	290	36	0	1.4%	31.7%
Hardwood forest	56,773	86.0%	18,396	2,275	0	85.7%	32.4%
Hardwood swamp	308	0.5%	266	201	0	1.2%	86.3%
Shrub swamp and floodplain forest	919	1.4%	498	128	0	2.3%	54.2%
Woodlands (natural)	193	0.3%	126	12	0	0.6%	65.1%
<i>Forested uplands and wetlands subtotal</i>	<i>59,108</i>	<i>89.6%</i>	<i>19,576</i>	<i>2,653</i>	<i>0</i>	<i>91.1%</i>	<i>33.1%</i>
Non-forested Uplands and Wetlands⁹							
Cliff and talus	257	0.4%	131	49	0	0.6%	51.1%
Freshwater marshes	637	1.0%	282	137	0	1.3%	44.3%
Pasture/hay/grassland	1,625	2.5%	511	130	0	2.4%	31.5%
Peatland	60	0.1%	16	0	0	0.1%	27.0%
Rocky outcrop	439	0.7%	90	0	0	0.4%	20.5%
<i>Non-forested uplands and wetlands subtotal</i>	<i>3,017</i>	<i>4.6%</i>	<i>1,030</i>	<i>317</i>	<i>0</i>	<i>4.8%</i>	<i>34.2%</i>
Inland aquatic habitats⁹							
Open Water	1,818	2.8%	462	250	0	2.2%	25.4%
<i>Inland aquatic habitats subtotal</i>	<i>1,818</i>	<i>2.8%</i>	<i>462</i>	<i>250</i>	<i>0</i>	<i>2.2%</i>	<i>25.4%</i>

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁶
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Other							
Developed	2,045	3.1%	408	107	0	1.9%	20.0%
<i>Other subtotal</i>	<i>2,045</i>	<i>3.1%</i>	<i>408</i>	<i>107</i>	<i>0</i>	<i>1.9%</i>	<i>20.0%</i>
TOTAL	65,987	100.0%	21,476	3,326	0	100.0%	32.5%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5 - Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.32. Ashuelot CFA – Preliminary Priority Refuge Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 18,396 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	Red-shouldered Hawk ^{I, J} Bobcat ^I Ovenbird^A Eastern Wood Pewee ^{A, J} Northern Flicker ^{A, J} Yellow-bellied Sapsucker ^A Rose-breasted Grosbeak ^A Eastern Red Bat^I Louisiana Waterthrush American Redstart ^{A, J} Veery ^A Black-throated Green Warbler ^A Black-throated Blue Warbler ^A Black-and-white Warbler ^J Black-billed Cuckoo ^{A, J} Broad-winged hawk ^J Eastern Whip-poor-will ^J Great-crested Flycatcher ^J Northern Goshawk ^{A, I, J} Scarlet Tanager ^J Northern Parula ^A Ruffed Grouse ^A Black Racer ^I
American Woodcock ^{A, B, C}	Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3 acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	
Chestnut-sided Warbler^{A, B, I}	Early successional deciduous forested upland and wetland habitat (Dunn et al, 1997, Richardson et al, 1995)	
Bald Eagle ^{C, G}	Breeding and migrating habitat includes large bodies of open water with little human disturbance, and large canopy trees or other elevated sites for nesting, perching, and roosting (DeGraaf et al. 2001).	
Blackburnian Warbler ^{A, B}	Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004).	
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Swamp⁵ - 266 acres		
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Northern Waterthrush Red-shouldered Hawk ^J Rose-breasted Grosbeak ^J Purple Finch ^{A, I} Veery ^{A, J} White-eyed Vireo ^J Northern Parula ^A Wood Duck ^J
Forested Uplands and Wetlands⁴		
Conifer Swamp⁵ - 290 acres		
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Red-shouldered Hawk ^J Rose-breasted Grosbeak ^J Purple Finch ^{A, I} Veery ^{A, J} White-eyed Vireo ^J Northern Parula ^A Wood Duck ^J
Shrub Swamp and Floodplain Forest⁵ - 498 acres		
American Woodcock ^{A, B, C}	Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Warbling Vireo Willow Flycatcher Veery ^A Ruffed Grouse ^A
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Chestnut-sided Warbler ^A American Redstart ^A Canada Goose ^J Mallard ^J Wood Duck ^J Eastern Kingbird ^J Gray Catbird ^J Wood Turtle^I
Forested Uplands and Wetlands⁴		
Woodlands (natural)⁵ - 126 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer, others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Cliff and Talus⁵ - 131 acres		
<p>Laurentian-Acadian acidic cliff and talus^H</p> <p>North-central Appalachian acidic cliff and talus^H</p> <p>North-central Appalachian circumneutral cliff and talus^H</p> <p>Laurentian-Acadian calcareous cliff and talus^H</p>	<p>These cliff systems occur at low to mid elevations, well below treeline. The vegetation within the <i>Laurentian-Acadian acidic cliff and talus system</i> is patchy and often sparse, punctuated with patches of small trees such as birches and spruce species. Species that prefer calcium rich soils are absent. In north-facing or other sheltered settings where cold air accumulates at the bottom of slopes, a shrubland of heaths and reindeer lichens can develop. The <i>North Central Appalachian acidic cliff and talus system</i> comprises sparsely vegetated to partially wooded cliffs. Most of the substrate is dry and exposed, but small (occasionally large) areas of seepage are often present. Vegetation in seepage areas tends to be comparatively well-developed and different from the surrounding dry cliffs. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places. Eastern red cedar is a characteristic tree species, poison ivy a characteristic woody vine, and common polypody a characteristic fern. Substrates within the <i>circumneutral cliff and talus system</i> include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. Ash, basswood, and American bladdernut are woody indicators of the enriched setting. The herb layer includes at least some species that are indicators of enriched conditions, e.g., yellow jewelweed, purple cliffbrake, ebony spleenwort, or bluntlobe cliff fern. <i>The calcareous cliff and talus system</i> has more nutrient rich soils, and the the vegetation is often sparse, but may include patches of small trees including northern white cedar, which may be the dominate species. Ash species and basswood are woody indicators of the enriched setting (Gawler 2008).</p>	<p>Uncommon plant community within the landscape that contributes to BIDEH*</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 282 acres		
American Black Duck^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	American Bittern^{A, I} Marsh Wren Virginia Rail^I Great Blue Heron ^I Wood Duck ^{A, J} Canada Goose ^J Common Loon ^{A, I} Mallard ^J Wood Turtle ^I
Pasture/Hay/Grassland⁵ – 511 acres		
American Woodcock ^{A, B, C}	Roosting habitat includes old fields with scattered tall herbaceous vegetation and/or shrubs. Herbaceous openings such as log landings and pasture used for singing grounds (Kelley et al. 2008, Sepik et al. 1994).	Field Sparrow ^J Chestnut-sided Warbler ^{A, I} Bobolink^A Grasshopper Sparrow^I Eastern Meadowlark^I
Peatland⁵ – 16 acres		
Boreal-Laurentian-Acadian acidic basin fen ^H	These fens have developed in open or closed relatively shallow basins with nutrient-poor and acidic conditions. The substrate is sphagnum, and vegetation typically includes areas of dominance by grasses and dwarf-shrubs. Leatherleaf is usually present, and scattered stunted trees may occur. These fens often develop adjacent to open water (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Rocky Outcrop⁵ – 90 acres		
Northern Appalachian-Acadian rocky heath outcrop ^H	The Northern Appalachian-Acadian rocky heath outcrop system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including Sheep laurel, Low-bush blueberry, Black huckleberry, and Black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 462 acres		
American Eel^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	Wood Turtle ^I Slimy Sculpin^I Tessellated Darter ^I
Brook Trout^{B, F}	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	
Dwarf Wedge-mussel^{B, D, F}	Inhabits creeks and small rivers, prefers the stable bank conditions afforded by gravel or sandy substrates, and good water quality (Nedeau et al. 2000, USFWS 1993).	
American Black Duck^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Canada Goose ^A Wood Duck ^A Hooded Merganser ^J Green-winged Teal ^J Mallard ^J Bald Eagle ^{A, I} Great Blue Heron ^I Common Merganser Ring-necked Duck Common Loon^{A, I}

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

- A: 2008 Bird Conservation Region 14.
- B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.
- C: 2008 USFWS Birds of Conservation Concern.
- D: Federal Threatened and Endangered status as of 2010, including Candidate Species
- E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010
- F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan
- G: Silvio O Conte Refuge Purpose Species.
- H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

- A: 2008 Bird Conservation Region 14.
- I: 2006 New Hampshire Wildlife Action Plan (Species of Greatest Concern)
- J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Ashuelot CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, chestnut-sided warbler, American woodcock, Canada warbler, blackburnian warbler, and bald eagle.

Rationale:

This large, contiguous block of matrix forest has been identified as a conservation priority by a host of partners including the State of New Hampshire's Wildlife Action Plan, the Nature Conservancy's Lower New England-Northern Piedmont Ecoregional Plan, and the Quabbin-to-Cardigan Collaborative Conservation Plan. We envision healthy forests within the Ashuelot CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of New Hampshire's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010).

Ashuelot CFA's hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is most certainly available within the CFA. To date our review of Ashuelot's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Ashuelot comes exclusively from a reading of forest history in New England—a legacy of intensive past-use has altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of Ashuelot are remarkably more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach combining passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Ashuelot will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided

warbler, ruffed grouse, bald eagles, and—if wetlands and riparian areas are present— Canada warbler (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009).

Ashuelot's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0 to 5 feet in height) are of particular importance. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and blackburnian warbler. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for blackburnian warblers, who are thought to be strongly associated with the hemlock forests within Ashuelot—and have been shown to decline in response to removal of hemlock by hemlock woolly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and—when along rocky bottomed streams—Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy— provide special habitats that, when near open bodies of water, are utilized by bald eagles. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure, species composition, and/or ecological function. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management.
- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.
- Reserve supracanopy trees in proximity to important habitats during management activities.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Hardwood Swamps)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for priority refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Ashuelot River Conservation Focus Area (CFA), hardwood swamps frequently have been altered and have potential for restoration. This habitat type in Ashuelot is found in small patches where soils have an impermeable or nearly impermeable clay layer that can create a shallow, perched water table. Saturation can vary, with ponding of water common during wetter seasons and drought during the summer or autumn months. The dynamic nature of the watertable drives complexes of forest upland and wetland species including pin oak, red maple, sweetgum, and black gum. Within the Connecticut River watershed, including the CFA, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions and soil compaction remain as threats.

Successional trends in hardwood swamps are not well understood. One possibility is that these areas were once in softwoods such as hemlock, fir, cedar, or spruce. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within Ashuelot will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Restoration of forest habitats and riparian areas will create high-quality habitat for neotropical migratory birds. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites. Hardwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Many species of conservation concern use forested swamps, including northern parula, willow flycatcher, white-eyed vireo, and rose-breasted grosbeak. Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well-developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Hardwood swamps in the Ashuelot CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Hardwood swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the Ashuelot CFA, and allow monitoring of population response to management actions (Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of New Hampshire, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Map vernal pools and seeps.
- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Conifer Swamps)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Ashuelot CFA, softwood swamps have undergone significant alteration and have potential for restoration. This habitat type is often found in small patches on mineral soils that are nutrient poor; there may be an organic layer, but generally deep peat soils are absent. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. The dynamic nature of the watertable drives complexes of forest upland and wetland species including red maple, balsam fir, red spruce, and ash species. Where soils tend more to alkaline conditions white cedar is a common tree species, and the shrub layer is generally more diverse. Within the Connecticut River watershed, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats.

Successional trends in softwood swamps are not well understood. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within Ashuelot will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aide in the restoration of historical species mixtures.

Where needed, restoration of softwood swamp habitats will create high-quality habitat for neotropical migratory birds. Closed canopy softwood forests that include white cedar and other softwoods provide important mast, food, nesting, and cover. Softwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well-developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Conifer swamps in the Ashuelot CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Conifer swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the Ashuelot CFA, and allow monitoring of population response to management actions (R. Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down Habitat Management Plan.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of New Hampshire, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1d. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American woodcock and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock and American black duck, priority refuge resources of concern.

American woodcock are dependant on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Shrub swamps in the CFA provide moist, rich soils for foraging and the dense shrubs provide cover from predators.

Management of the shrub swamp communities may be required to maintain shrub dominance and stem densities. Tree species, such as red maple, tend to replace mature shrub species and established invasive plants compete for nutrients and space. These invading species require management in order to maintain the native shrub diversity of the community. A high shrub stem density is also important as it provides birds with cover from predators and more leaf surface area for gleaning. Cover for American woodcock, for example, is ideal in a 10-15 year old shrub swamp (USDA 2001). Shrub species, in particular alder, tend to die back as they reach maturity, and as a result stem density decreases. Periodic rejuvenation of shrubs is necessary to maintain required stem densities. Management priority will be given to shrub swamps that are part of a woodcock management area. Management of these shrub swamps will benefit other species that use these communities, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season, and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests in the vicinity of foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1e. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Ashuelot CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily, and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams (Gawler 2008). These marshes are also maintained over time by beaver activity, an important natural disturbance process within the Ashuelot watershed.

Our coarse-scale habitat analysis of this CFA identifies the majority of the wetlands are scattered throughout with the largest freshwater marsh acreage occurring within a large wetland complex on the north end of Surry Mountain Lake. This particular wetland complex, adjacent to open water habitat, would provide important breeding and foraging habitat for American black duck, and other waterfowl species. Located within the Connecticut River watershed, an important migration corridor, this area would also be important as staging areas for migrating waterfowl. An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for waterfowl species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of freshwater marshes at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate wetland hydrology for impacts to natural flow regimes.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities.
- Survey wildlife use of existing wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) as part of a mosaic of habitat conditions required by American woodcock and other shrub-dependent conservation concern species such as chestnut-sided warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

Over two percent of the Ashuelot CFA is typed as pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow. American woodcock, a refuge priority resource of concern, will use both habitat conditions when managed in conjunction with their other habitat needs.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Shrubland and grassland habitats will also be used by American woodcock, which require diverse structural habitat conditions within close proximity of each other: clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young hardwood forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Small clearings with minimal vegetation is required for courtship areas, and shrublands with clumps of tall vegetation or sparse shrubs will provide roosting habitat.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, and grassland acres can provide quality habitat, for these species, and American woodcock, if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of these habitats to determine their condition, size and location, which will inform and prioritize appropriate management strategies in the HMP.

Sub-objective 1.2c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

See rationale for sub-objective 1.1e.

Habitats that occur within the Ashuelot CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to

bark, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout, American eel, and dwarf wedgemussel. Also provide undisturbed breeding and foraging habitat for American black duck, and staging areas for migrating waterfowl.

Rationale:

The Ashuelot River CFA supports numerous pond, wetland and river habitats. A portion of the Ashuelot River (from Village Pond to Surry Mountain Lake) meanders through the hilly terrain of the CFA. The main stem and tributaries provide habitat for American eel, and possibly eastern brook trout. A species inventory will be necessary to confirm brook trout presence. The Ashuelot River, below Surry Mountain Lake, also supports the federally endangered dwarf wedgemussel. This species requires stable bank conditions afforded by gravel or sandy substrates, and good water quality (U.S. Fish and Wildlife Service 1993, Neddeau et al. 2000).

Surry Mountain Lake is located in the southern portion of the CFA. This man-made lake is associated with the Surry Mountain Dam, which was built on the Ashuelot River in 1941 by the U.S. Army Corps of Engineers to prevent flooding along the Connecticut River. This 265-acre lake is managed by New Hampshire Fish and Game Department and the Army Corps of Engineers, and supports various species of bass, crappie, walleye, and lake trout. Backwater areas and wetlands surrounding Surry Mountain Lake may provide quality breeding, foraging and stopover habitat for American black duck, and other waterfowl species.

The aquatic habitats in the Ashuelot CFA are diverse, and provide habitat for a variety of wildlife species. Development and human activities may have impacted water quality and infringed on aquatic species movements and life cycles. Clear aquatic species passage to spawning and wintering habitat and structurally diverse in-stream habitat are important to the survival of aquatic species in this CFA. High water quality is essential to the survival of current and future dwarf wedgemussel populations. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Work with partners to implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to identify manmade physical barriers (e.g. impassable road crossings, culverts and dams) to the movement of fish and other aquatic organisms.
- Work with partners to conduct stream assessments to evaluate stream and fish community health.
- Work with partners to evaluate dwarf wedge mussel populations, and determine best management strategies for the maintenance of this species in the CFA.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Ashuelot River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Ashuelot River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Ashuelot River Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Ashuelot River Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Ashuelot River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Ashuelot River Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Ashuelot River Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Ashuelot River Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, and printed media at the Ashuelot River Division.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures (e.g., general brochure and bird checklist) that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Ashuelot River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Ashuelot River Division would be unstaffed and is not anticipated to have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations and division-specific regulations, if necessary.

Rationale:

Hunting is a priority public use, allowed on national wildlife refuges, as long as it is found to be a compatible use. The Ashuelot River CFA is a popular area to hunt white-tailed deer, Eastern wild turkey, and small game. There is a moose season, but the number of tags is limited. Hunting, consistent with the final compatibility determination, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
 - (a) The season for hunting snowshoe hare and coyotes with dogs is from October 1 to March 15.
 - (b) Use of bait is prohibited.
 - (c) Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with New Hampshire Fish and Game Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at Ashuelot River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America’s natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the Ashuelot River Division after completing all administrative procedures to officially open refuge lands to fishing, based on New Hampshire Fish and Game Department regulations, and any division-specific conditions.

Rationale:

The Ashuelot River is the longest tributary of the Connecticut River in New Hampshire. Aquatic habitats include an Army Corps of Engineers Reservoir (Surry Mountain Lake), and both cold and warm water stream reaches. The reservoir supports perch, pickerel, bass, and crappie. The river has stocked trout and native Eastern brook trout in colder reaches and warm water species like large and small mouth bass near the confluence with the Connecticut River. Fishing is a popular activity throughout the river would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.
- The Ashuelot River Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land with fishable waters:

- Work with the New Hampshire Fish and Game Department to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. To facilitate fishing, the refuge will make information readily available to interested anglers regarding opportunities on Service-owned land, location of fishable waters, and available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity in southern New Hampshire. Local organizations such as the Monadnock Chapter of New Hampshire Audubon, the Harris Center for Conservation Education, and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring sufficient land:

- Develop a public access strategy and complete the required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would likely be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring sufficient land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, Big Sit, etc.
- Encourage local schools and groups such as the Monadnock Chapter of New Hampshire Audubon, the Harris Center for Conservation Education, and other environmental organizations to offer wildlife-centered trips to the division.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring sufficient land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge visitor services plan.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Ashuelot River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include the Connecticut River waterway route. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Ashuelot River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Ashuelot River Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Work with users to delineate winter cross-country skiing trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of acquiring sufficient land:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Blueberry Swamp Conservation Focus Area (Existing Refuge Division)

Columbia, New Hampshire

Conservation Focus Area (CFA) — Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	4,754	100 %
<ul style="list-style-type: none"> ■ Existing Refuge Ownership in CFA¹ ■ Additional Acres in CFA proposed for Refuge Acquisition² 	1,166	3,588
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	0	0 %
Total Acres in CFA ^{2, 4}	4,754	100 %

¹Acres from Service’s Realty program (surveyed acres);²Acres calculated using GIS;³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The existing Blueberry Swamp Division was established on December 18, 2007 and is now approximately 1,166 acres. Near the existing division is a large core of conserved lands: the 18,400-acre Bunnell Mountain Forestry Legacy tract and the 40,000 acre Nash Stream State Forest. These two conserved areas protect one of the largest contiguous blocks of high-elevation spruce forest in New England. Our existing division and proposed expansion would connect to this block and conserve the large wetland area that drains these two areas and connects to the Connecticut River. Our proposed expansion would increase the habitat diversity of the area by adding lower elevation wetlands to the larger conserved area. The wetlands complex includes Simms Stream, which empties directly into the Connecticut River as well as conifer swamps. Protection of this stream and other wetland areas would help conserve water quality and cold-water streams for eastern brook trout and other aquatic species.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Conifer Swamp/ Spruce-fir – 54.0%
- Shrub Swamps and Floodplain Forest - 4.6%
- Pasture/Hay/Grassland – 2.7%

For more information on habitats in the CFA, see map A.45 and table A.33.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.34 below, there are seven Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN), as well as species that require large contiguous forest tracts such as forest interior dwelling bird species. These species and others are discussed further below.

1. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Blueberry Swamp CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat as well.

The Blueberry Swamp CFA provides over 4,600 acres of contiguous habitat for a diversity of migratory landbirds. Over half of the CFA is spruce-fir forest, which may provide habitat for uncommon boreal species including boreal chickadee, black-backed woodpecker, spruce grouse, gray jay, bay-breasted warbler, rusty blackbird, blackpoll warbler, and olive-sided flycatcher. The hardwood forests may provide habitat for other species of conservation concern, including PRRC species such as Canada warbler, blackburnian warbler, black-throated blue warbler, and American woodcock.

Almost three percent of the Blueberry Swamp CFA is in agriculture, consisting mostly of large hayfields between 25 to 30 acres, and could be combined to provide a larger contiguous block. Many grassland birds are area sensitive, and require large grassland acres (greater than 25 acres or 10 hectares) including grasshopper sparrows, bobolinks, eastern meadowlarks, and upland sandpiper (Vickery et al. 1994), while other species, such as the American woodcock, do not require extensive open habitat acres.

Grasslands are a high priority habitat for the state of New Hampshire. These habitats provide breeding and nesting habitat for several state threatened and endangered species, including Northern harrier, upland sandpiper, eastern meadowlark, and grasshopper sparrow. Northern harriers breed in large grassland habitats in northern Coos County, including the Blueberry Swamp CFA, where the hayfields have declined 10 percent over the course of 10 years (Oehler et al. 2006).

2. Waterfowl

The large wetland complex known as “Blueberry Swamp” may provide breeding and foraging habitat for American black duck, a PRRC species, as well as wood duck, Canada geese, and other waterfowl species.

3. Diadromous fish and other aquatic species

Simms Stream, the East Branch of Simms Stream, and various brooks within the Blueberry Swamp CFA support wild brook trout populations as well as slimy sculpin, a State species of greatest conservation need. Brook trout are a PRRC species, and are a species of conservation concern for the Service’s Northeast Region.

Although, not documented within this particular area, northern redbelly dace and/or finescale dace, both species of state conservation concern, are likely to occupy beaver ponds and other aquatic systems associated with slow moving streams. These species would benefit from efforts focusing on increasing and restoring stream riparian areas and connectivity (road crossing designs that incorporate aquatic species passage). Land protection efforts within this area would also benefit resident fish species that occupy the Connecticut River, about 5 miles downstream from the CFA. These species include round whitefish and tessellated darter (host species to the dwarf wedgemussel).

4. Wetlands

The Blueberry Swamp CFA contains a large wetland complex of approximately 430 acres known as “Blueberry Swamp.” This wetland is mostly shrub swamp and cedar swamp, with a small portion of freshwater marsh. The slow moving waters of the East Branch of Simms Stream forms the eastern boundary. Additional wetlands occur along Simms Stream, and other areas in the CFA.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan. Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and native species will dominate. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition, while management within pasture, hay, grassland habitats will provide grassland and shrub habitats. Invasive plant management will be a priority.
- In open water (stream, rivers, ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and clear aquatic species passage to spawning and wintering habitat.

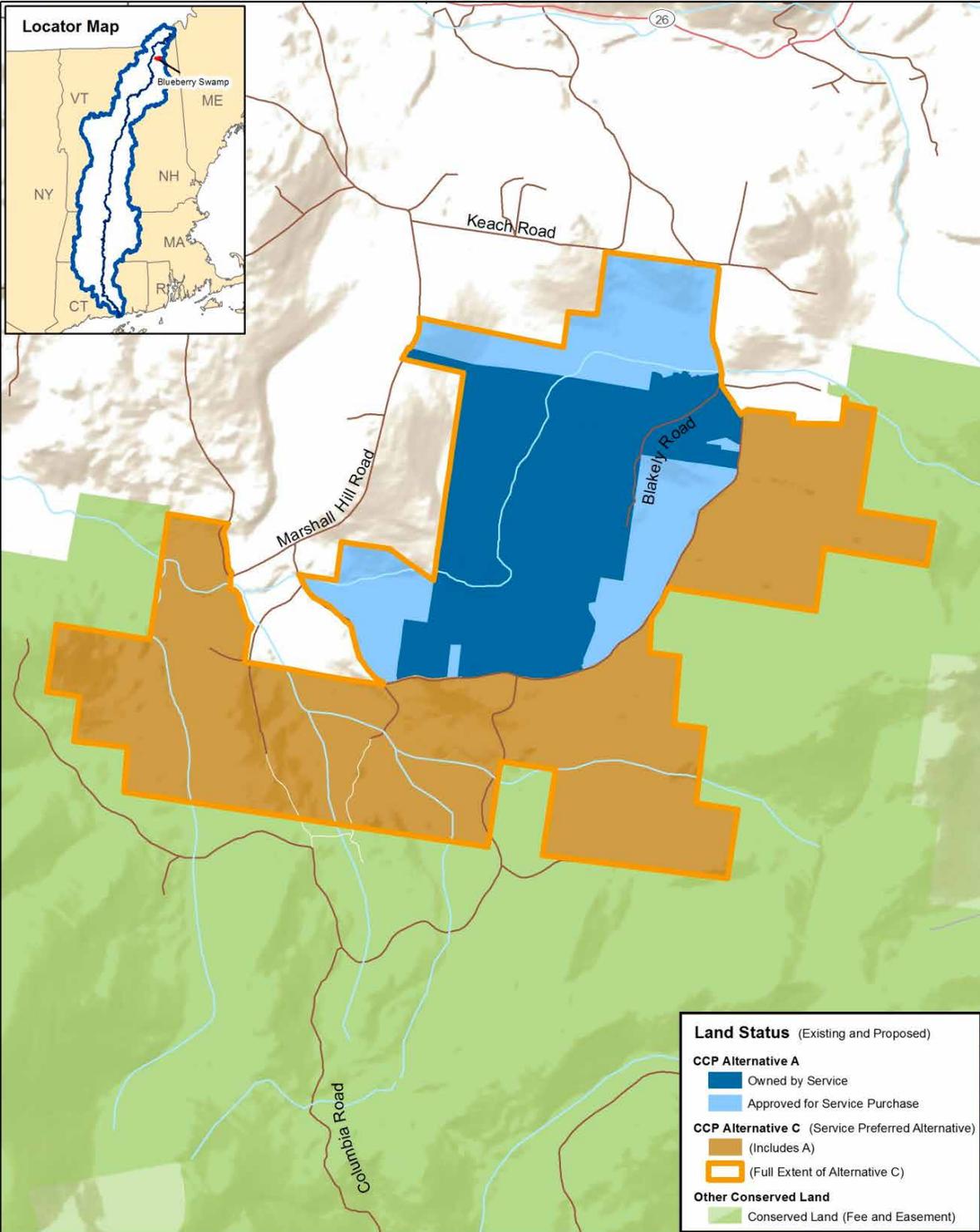
What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority, wildlife-dependent recreational opportunities: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

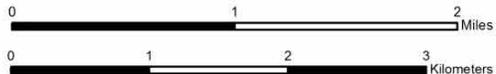
Map A.44. Blueberry Swamp CFA – Location.



U.S. Fish & Wildlife Service Blueberry Swamp CFA under CCP Alternative C
Silvio O. Conte National Fish and Wildlife Refuge



This map is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. The conserved lands layer (2012) was obtained from Trust for Public Land. Other 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: 3/18/2015



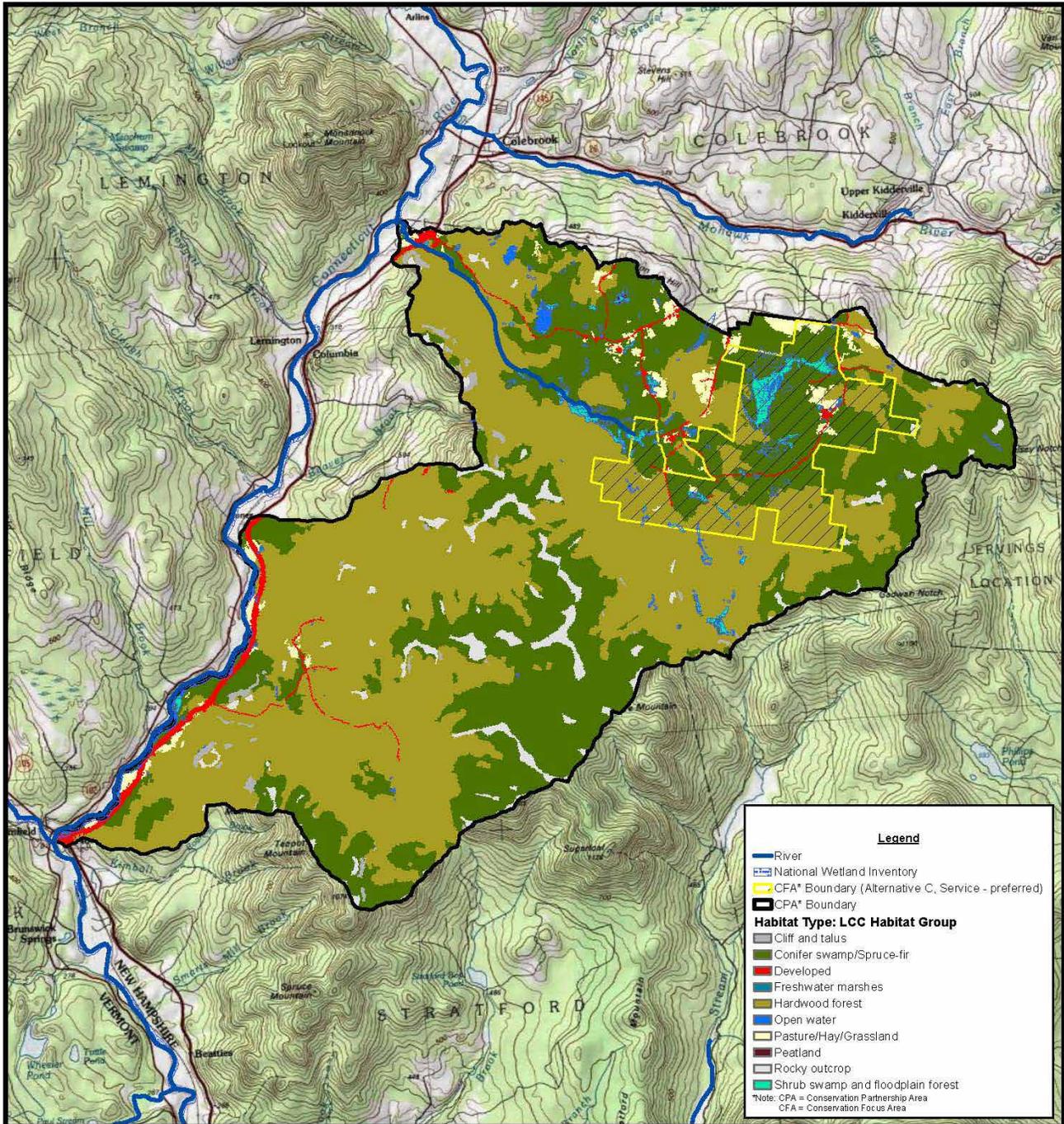
Map A.45. Blueberry Swamp CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Blueberry Swamp CPA* - NH

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management. It is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. For more information visit the USFWS Northeast Region GIS website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013



Table A.33. Blueberry Swamp CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands⁹							
Conifer swamp/spruce-fir	14,905	37.7%	2,496	0	671	54.0%	16.7%
Hardwood forest	21,122	53.5%	1,676	0	184	36.2%	7.9%
Shrub swamp and floodplain forest	380	1.0%	211	0	141	4.6%	55.6%
<i>Forested uplands and wetlands subtotal</i>	<i>36,408</i>	<i>92.2%</i>	<i>4,384</i>	<i>0</i>	<i>996</i>	<i>94.8%</i>	<i>12.0%</i>
Non-forested Uplands and Wetlands⁹							
Cliff and talus	256	0.6%	0	0	0	0.0%	0.0%
Freshwater marshes	127	0.3%	23	0	14	0.5%	18.0%
Pasture/hay/grassland	732	1.9%	125	0	20	2.7%	17.1%
Peatland	4	0.0%	0	0	0	0.0%	0.0%
Rocky outcrop	1,092	2.8%	11	0	0	0.2%	1.0%
<i>Non-forested uplands and wetlands subtotal</i>	<i>2,212</i>	<i>5.6%</i>	<i>159</i>	<i>0</i>	<i>34</i>	<i>3.4%</i>	<i>7.2%</i>
Inland aquatic habitats⁹							
Open Water	119	0.3%	0	0	0	0.0%	0.0%
<i>Inland aquatic habitats subtotal</i>	<i>119</i>	<i>0.3%</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0.0%</i>	<i>0.0%</i>
Other							
Developed	764	1.9%	84	0	16	1.8%	10.9%
<i>Other subtotal</i>	<i>764</i>	<i>1.9%</i>	<i>84</i>	<i>0</i>	<i>16</i>	<i>1.8%</i>	<i>10.9%</i>
TOTAL	39,503	100.0%	4,627	0	1,046	100.0%	11.7%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.34. Blueberry Swamp CFA – Preliminary Priority Refuge Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Conifer Swamp/Spruce-fir Forest⁵ - 2,496 acres		
Blackburnian Warbler ^A	Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004).	Cape May Warbler ^{A, J} Boreal Chickadee ^{A, J} Purple Finch ^{A, J} Black-throated Green Warbler ^{A, J}
Rusty Blackbird ^{A, C}	Breeding habitat includes conifer dominated forested wetlands interspersed with shrub swamps and peatlands. Young spruce and fir may be required for nesting (Greenland et al, 2010, Powell et al., 2010, and Matsuoka et al, 2010).	Spruce Grouse ^{A, I} American Marten ^I Canada Lynx ^{I, J} Gray Jay ^{A, I, J} Black-backed Woodpecker ^{A, I, J} Bay-breasted Warbler ^{A, I, J}
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	White-throated Sparrow Blackpoll Warbler ^{A, I} Brown Creeper ^J Northern Saw-whet Owl ^J Olive-sided Flycatcher ^{A, I, J} Palm Warbler ^{A, J} Pine Grosbeak ^{A, J} Northern Parula ^A Sharp-shinned Hawk ^J Yellow-bellied Flycatcher ^J
Hardwood Forest⁵ - 1,676 acres		
American Woodcock ^{A, B, C}	Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Ruffed Grouse ^{A, I} Whip-poor-will ^{A, I, J} Canada Lynx ^I Chestnut-sided Warbler ^{A, I} Ovenbird ^A Eastern Red Bat ^I American Redstart ^{A, J}
Black-throated Blue Warbler ^A	Breeding habitat includes mature deciduous and mixed deciduous/conifer forests with a shrubby understory (Degraaf et al. 2001, Hodgman et al. 2000, Dobbs 2007, Dunn et al. 1997)	Veery ^A Black-and-white Warbler ^J Broad-winged hawk ^J Eastern Wood-pewee ^{A, J} Northern Flicker ^{A, J} Northern Goshawk ^{A, I, J} Red-shouldered Hawk ^{I, J} Sharp-shinned Hawk ^J Northern Parula ^A Yellow-bellied Sapsucker ^{A, J}

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 211 acres		
American Woodcock ^{A, B, C}	Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands, and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Northern Harrier ^{A,I} Chestnut-sided Warbler ^{A,I} American Redstart ^{A,J} Eastern Kingbird ^J Gray Catbird ^J
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Warbling Vireo Willow Flycatcher Northern Leopard Frog ^I Ruffed Grouse ^{A,I}
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 23 acres		
Laurentian-Acadian freshwater marsh ^H	These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Vegetation includes common bulrush, narrow-leaf cattail, marsh fern, common jewelweed and sedges (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Pasture/Hay/Grassland⁵ - 125 acres		
Maintain as contiguous block of pasture/hay/grassland habitat	These habitat types include ruderal uplands and old-fields such as abandoned pastures; lands that are intensively managed for cool season grasses, such as Canada rye, redbud, and June grass or warm season grasses, such as switch grass, indian grass and blue stem; and hayfields/pastures that are intensively managed for cool season grasses or are active pastures (Gawler 2008).	American Woodcock ^{A,I,J} Field Sparrow ^J Northern Harrier ^{A,I,J} Common Night Hawk ^{A,I} Bobolink^A Grasshopper Sparrow^I Eastern Meadowlark^I

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Rocky Outcrop⁵ – 11 acres		
Northern Appalachian-Acadian rocky heath outcrop ^H	<i>The Northern Appalachian-Acadian rocky heath outcrop</i> system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including sheep laurel, low-bush blueberry, black huckleberry, and black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Inland Aquatic Habitats⁴		
Water⁵ – (GIS data did not capture acreage due to dense forest cover along small stream and river corridors)		
Brook Trout^{B, F}	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	Slimy Sculpin^I Northern Redbelly Dace ^I Wood Turtle ^I

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

- A: 2008 Bird Conservation Region 14.
- B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.
- C: 2008 USFWS Birds of Conservation Concern.
- D: Federal Threatened and Endangered status as of 2010, including Candidate Species
- E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010
- F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan
- G: Silvio O Conte Refuge Purpose Species.
- H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

- A: 2008 Bird Conservation Region 14.
- I: 2006 New Hampshire Wildlife Action Plan (Species of Greatest Concern)
- J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Blueberry Swamp CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including black-throated blue warbler, and American woodcock.

Rationale:

We envision healthy forests within the Blueberry Swamp CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of New Hampshire's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

Blueberry Swamp CFA's hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is most certainly available within the CFA. However, to date our review of Blueberry Swamp's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Blueberry Swamp comes exclusively from a reading of forest history in New England—a legacy of intensive past-use has altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of Blueberry Swamp are remarkably more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory will test these assumptions, and aid in identifying stands where a forest management approach combining passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Blueberry Swamp will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided warbler, ruffed grouse, and—if wetlands and riparian areas are present—Canada warbler (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009).

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Blueberry Swamp's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance to species like black-throated blue warbler and Canada warbler. These habitat elements may have importance to declining mature forest-interior species like blackburnian warbler—identified as a representative species by the North Atlantic Landscape Conservation Collaboration. Black-throated blue warblers nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils and leaf litter are important habitat features (Bull 1974, Darveau et al. 1992, DeGraaf and Yamasaki 2001). Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for blackburnian warblers, who dwell in the upper canopies of conifers, and are thought to be strongly associated with the hemlock forests within Blueberry Swamp. Blackburnian warblers have been shown to decline in response to removal of hemlock by hemlock woolly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like black-throated blue warblers who often nest in the fork of coniferous or deciduous saplings. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Close canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, wood thrush, and—when found on wetter soils—Canada warbler.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like American marten, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species, such as glossy buckthorn, are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct forest and wildlife inventories.
- Map vernal pools and seeps.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1b. (Shrub swamp and floodplain forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American woodcock and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock and American black duck, priority refuge resources of concern.

American woodcock are dependent on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Shrub swamps in the CFA provide moist, rich soils for foraging and the dense shrubs provide cover from predators.

Management of the shrub swamp communities may be required to maintain shrub dominance. Most shrub swamps maintain themselves, but tree species, such as red maple, can become established, and dominate the wetland community. Invasive plants, such as common reed, are a threat to these communities, and mechanical and chemical treatment of this invasive reed is necessary. Management of these shrub swamps will not only benefit American woodcock, but other shrub swamp specialists, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests in the vicinity of foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Ensure a diversity of native species is present and non-native species, such as glossy buckthorn, are excluded or managed to keep population levels as low as possible.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Inventory wetland plant communities.
- Evaluate wetland hydrology for impacts to natural flow regimes.
- Survey wildlife use of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Conifer Swamp/Spruce-fir)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve landscape connectivity of spruce-fir habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including Blackburnian warbler, rusty blackbird, and Canada warbler.

Rationale:

Of the forest types within the Blueberry CFA, spruce-fir forest and softwood swamps have undergone significant alteration and has the greatest potential for restoration. Pre-European settlement, most forest stands in this habitat type consisted primarily of long lived red spruce with varying components of balsam fir, white birch, and other overstory species. Within the Northern Forest region, including the CFA, utilitarian forest management practices converted tens of thousands of acres to homogeneous second or third growth stands more heavily dominated by balsam fir. By some estimates, less than 1 percent of the area formerly covered by the late successional stage of this habitat type still exists in the northeastern United States (Williams 1992, Whitney 1996, Hagan and Whitman 2004). Fortunately, emerging research (Franklin et al. 2002, Keeton 2006, North and Keeton 2008, Smith et al. 2008b, 2008a) has shown silvicultural systems designed to mimic the natural disturbance regimes endemic to this habitat type have restorative qualities. These and future studies will inform efforts to restore this habitat type. Future management should focus on promoting the ecological integrity of these stands and (where and when possible) restoring composition and structure to accepted historical conditions.

Blackburnian warbler, Canada warbler and rusty blackbird use different seral stages within the spruce-fir forest. Blackburnian warblers use mature conifer forests of spruce, fir, hemlock, and pines, and mixed wood habitats including deciduous stands with patches of conifer (Morse 1994, Dunn and Garrett 1997, DeGraaf and Yamasaki 2001). They are considered a forest interior species, making them susceptible to forest fragmentation and short rotation timber harvesting (Morse 1994, Hagan et al. 1996). The Blueberry Swamp CFA is in the core of its range, and management for this species will also provide habitat for bay-breasted warbler, boreal chickadee, black-backed woodpecker, and gray jay.

Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well-developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009).

Rusty blackbirds nest in shrub swamps and along riparian areas within spruce-fir forested wetlands. Disturbances such as beaver activity and wind throws create forest openings allowing softwood regeneration and potential rusty blackbird habitat (Avery 1995).

The management priorities for this habitat type, including structural diversity and landscape connectivity, and habitat requirements for priority resources of concern, will benefit other species of conservation concern such as spruce grouse, Canada lynx, and wintering deer.

Management Strategies:

Within 5 years of CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.
- Ensure this habitat type provides effective winter shelter for white-tailed deer, consistent with management of refuge resources of concern.
- Evaluate hydrologic regime to inform restoration efforts.

Within 10 years of CCP approval:

- Ensure a diversity of native species is present and non-native species, such as glossy buckthorn, are excluded or managed to keep population levels as low as possible.
- Implement identified active forest management opportunities by using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Where appropriate, emulate the natural disturbance regime inherent to the forest types within this broad habitat type and work within the confines of seral pathways dictated by soil, climate, and hydrology.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Pasture/Hay/Grassland)

Maintain a contiguous block of pasture, hay, and grassland habitat to provide breeding and foraging habitat for various grassland birds. Management will also benefit refuge priority resources of concern including American woodcock.

Rationale:

Native grassland was once more widespread in North America. A deterioration of rangelands, the conversion of prairies to agriculture, and afforestation of the eastern United States are significant factors to the decline of grassland bird populations. During European settlement millions of hectares of forests were cleared for agriculture in the eastern U.S. creating habitat for grassland dependent birds. As agricultural activities declined, open areas dominated by herbaceous vegetation began to convert back to forests, causing a drastic decline in

grassland species in the region. Naturally occurring grassland ecosystems were not uncommon in the eastern U.S., but, were found closer to the coast rather than inland (Brennan and Kuvlesky Jr 2005). These grassland ecosystems have since been impacted by development and fragmentation.

Grasslands are a high priority habitat for the state of New Hampshire. These habitats provide breeding and nesting habitat for several state threatened and endangered species, including northern harrier, upland sandpiper, eastern meadowlark, and grasshopper sparrow. Northern harriers are breeding in large grassland habitats in northern Coos County, including the Blueberry Swamp CFA, where the amount of hayfields has declined 10 percent over the course of 10 years (Oehler et al. 2006).

Almost three percent of the Blueberry Swamp CFA is in agriculture, consisting mostly of large hayfields between 25 to 30 acres, and could be combined to provide a larger contiguous block. Many grassland birds are area sensitive, and require large grassland acres (greater than 25 acres or 10 hectares) including grasshopper sparrows, bobolinks, eastern meadowlarks, and upland sandpiper (Vickery et al. 1994), while other species, such as the American woodcock, do not require extensive open habitat acres.

Management in the Blueberry Swamp CFA will focus on maintaining contiguous grassland habitat with a variety of structure and native herbaceous species. A mixture of grasses, and broad-leaved forbs with scattered shrubs or clumps of herbaceous vegetation will provide roosting, and potential feeding areas, for American woodcock, and breeding and foraging habitat for bobolinks and northern harrier. While sparsely vegetated areas of approximately a half acre will provide courtship sites for woodcock. Grasslands that are outside the contiguous grassland acres may be managed as shrublands or converted back to forest depending on the location.

Due to our unfamiliarity with the habitat conditions in the CFA, a comprehensive, multi-scale habitat and wildlife inventory will be necessary to implement refuge strategies. This inventory will need to encompass all habitats within the CFA and associated landscape. This baseline information will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Ensure a diversity of native species is present and non-native species, such as glossy buckthorn autumn olive, reed canary grass, and Canada thistle, are excluded or managed to keep population levels as low as possible.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Assess the condition of pasture, hay and grassland habitats, as well as the overall size and location in the CFA, and proximity to other forest openings, to inform more detailed management strategies in an HMP.

Sub-objective 1.2b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted

climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Blueberry Swamp CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout.

Rationale:

Simms Stream, the East Branch of Simms Stream, and various brooks within the Blueberry Swamp CFA support wild brook trout populations, as well as slimy sculpin, a state species of greatest conservation need. Although, not documented within this particular area, northern redbelly dace and/or finescale dace, both species of state conservation concern, are likely to occupy beaver ponds and other aquatic systems associated with slow moving streams. These species would benefit from efforts focusing on increasing and restoring stream riparian areas and connectivity (road crossing designs that incorporate aquatic species passage). Land protection efforts within this area would also benefit resident fish species that occupy the Connecticut River, about 5 miles downstream from the CFA. These species include round whitefish and tessellated darter (host species to the dwarf wedge mussel).

Management of water resources in the Blueberry Swamp CFA will provide clear aquatic species passage to spawning and wintering habitat, structurally diverse instream habitat, with boulders and downed woody debris providing riffles and pools, and shade trees along riparian edges. Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Aquatic species survival and breeding success is dependent on not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of the water resources in the CFA at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct stream assessments to evaluate stream and fish community health.
- Identify man-made physical barriers (e.g. impassable road crossings, culverts and dams) to the movement of fish and other aquatic organisms.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Blueberry Swamp Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Blueberry Swamp Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Blueberry Swamp Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Blueberry Swamp Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Blueberry Swamp Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Blueberry Swamp Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Blueberry Swamp Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Blueberry Swamp Division.
- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See the rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Blueberry Swamp Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge Web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures (e.g., general brochure and bird checklist) that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Blueberry Swamp Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Blueberry Swamp Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations and division-specific regulations, if necessary.

Rationale:

Hunting is allowed on national wildlife refuges, as long as it is found to be a compatible use. Blueberry Swamp has been a popular area with hunters for many years prior to acquisition by the Service. All of the division is currently open to hunting. Retaining hunting opportunities at this division conforms to historic use on this property and much of the surrounding land in the area. Popular game species include white-tailed deer, moose, ruffed grouse, American woodcock, black bear, and snowshoe hare. Allowing hunters to use public lands helps ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

Continue to:

- Allow hunter access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise to 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain hunting on the division, based on New Hampshire Fish and Game Department and the following division-specific regulations:
 - (a) The season for hunting snowshoe hare and coyotes with dogs is from October 1 to March 15.
 - (b) Use of bait is prohibited.
 - (c) Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of CCP approval:

- Work with New Hampshire Fish and Game Department to determine whether opportunities exist for State-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Work with New Hampshire Fish and Game Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

Within 1 year of CCP approval:

- Produce a hunt brochure that includes information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at Blueberry Swamp Division kiosks, through a friends group, and in local businesses.
- Work with New Hampshire Fish and Game Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.

Within 5 years of CCP approval:

- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the Blueberry Swamp Division. Complete all administrative procedures to officially open refuge lands to fishing, based on New Hampshire Fish and Game Department regulations, and division-specific conditions, if necessary.

Rationale:

Fishing is a priority public use on national wildlife refuges and a popular outdoor recreational activity. The division has been open to fishing, following acquisitions, through pre-acquisition compatibility determinations, but no formal opening package or fishing plan has been completed. Although fishing is not as popular as hunting at this division, there still are opportunities for visitors to fish the East Branch of Simms Stream.

Management Strategies:

Continue to:

- Post newly acquired properties to ensure refuge boundary lines are clearly marked.

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.
- The Blueberry Swamp Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of CCP approval:

- Work with the New Hampshire Fish and Game Department to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Although most dedicated anglers will be drawn to the nearby White Mountain National Forest, the Connecticut River, or other areas better known for fishing, the East Branch of Simms Stream offers the opportunity to fish for Eastern brook and rainbow trout. To facilitate fishing, the refuge will make information readily available to interested anglers regarding opportunities on Service-owned land, location of fishable waters, and available game fish.

Management Strategies:

Within 5 years of CCP approval:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at the division kiosk, through friends groups, and in local businesses.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity in northern New Hampshire. Currently, there is no infrastructure in place at the division to support these uses, and consequently, visitation for wildlife viewing and photography is limited and dispersed.

Management Strategies:

Continue to:

- Allow wildlife observation and photography at the Blueberry Swamp Division.
- Allow public access at the Blueberry Swamp Division daily from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.

- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 10 years of CCP approval:

- Evaluate the feasibility and demand for a native surface, primitive loop trail that through the fields and forests, and ultimately down to the East Branch of Simms Stream. Complete the required planning (i.e. NEPA, compatibility determination), if a trail is warranted.

Within 15 years of CCP approval:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with the friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division is available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. Visitation increases are expected as this division expands and becomes better known. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

Within 1 year of CCP approval:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of CCP approval:

- Develop interpretive panels that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups to offer wildlife-related trips to the division.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Blueberry Swamp Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

This sub-objective is not applicable to the Blueberry Swamp Division because there are limited opportunities for canoeing or kayaking, and the East Branch of Simms Stream is not part of a larger water-based trail network.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Blueberry Swamp Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Blueberry Swamp Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

Continue to:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.

Within 1 year of CCP approval

- Work with users to delineate winter cross-country skiing trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Mascoma River Conservation Focus Area (Proposed)

Lyme, Dorchester, Hanover, and Canaan, New Hampshire

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	20,601	91.4%
<ul style="list-style-type: none"> ■ Existing Refuge Ownership in CFA¹ ■ Additional Acres in CFA proposed for Refuge Acquisition² 	0 20,601	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	1,931	8.6%
Total Acres in CFA ^{2,4}	22,532	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

On February 23, 2015, we acquired a 761-acre easement which established the Mascoma River Division. This easement gives us the authority to manage habitat and public use in this area. The Mascoma River CFA was identified as high priority for conservation for the State of New Hampshire and contains a large, intact forested area which has diversity in elevation and aspect and includes numerous small, scattered, forested wetlands. The proposed Mascoma River CFA is located within an existing network of conserved lands, including the White Mountain National Forest, Mascoma River and Cumins Pond Wildlife Management Areas, and several privately owned tracts. Additional land protection by the Service in this area will help better connect these conserved lands. The Appalachian Trail Corridor, which crosses the proposed CFA, provides outstanding recreational opportunities. The proposed CFA would help form a better connection between the White Mountain National Forest and the Appalachian Trail.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 92.5%
- Shrub swamp and Floodplain Forest – 1.2%
- Conifer Swamp – 1.9%
- Freshwater Marsh – 0.4%

For more information on habitats in the CFA, see map A.47 and table A.35.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.36 below, there are seven Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to species that require large

contiguous forest tracts such as forest interior dwelling bird species, and State Species of Greatest Conservation Need (SGCN). These species and others are discussed further below.

1. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Mascoma River CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat for a diversity of bird species.

Habitats in the Mascoma CFA have been identified as being of “Highest Quality in New Hampshire” in the New Hampshire Wildlife Action Plan (New Hampshire Fish and Game Department 2005). The CFA contains a mosaic of unfragmented habitats that contribute to the larger core of undeveloped land within the landscape. These habitats provide breeding habitat for a diversity of landbirds including species of conservation concern and forest interior dwelling species. This CFA is in the core range of many of these species including PRRC species such as wood thrush, chestnut-sided warbler, American woodcock, Canada warbler and blackburnian warbler. Other species of conservation concern include black-throated blue warbler, purple finch, and black-throated green warbler. Peregrine falcon is another PRRC species, as well as a State Species of Greatest Conservation Need (SGCN). The cliff and talus systems in the CFA are used by nesting peregrine falcons, where the elevations can rise above 2,000 feet.

2. Waterfowl

Potential breeding and foraging habitat for American black duck, a PRRC species, as well as wood duck, Canada geese, and other waterfowl species within wetlands adjacent to slow-moving streams and open water habitats. New Hampshire Audubon observed breeding and migrating Canada geese, wood duck, mallard, ring-necked duck, and hooded merganser in ponds adjacent to the CFA. As well as American black duck, green-winged teal, and common merganser during migration (Hunt personal communication 2008).

3. Diadromous fish and other aquatic species

The Mascoma River watershed supports high water quality streams that are pristine with minimal impacts from human influences. The Mascoma River CFA supports numerous minimally developed ponds, perennial and intermittent streams, and river habitats, including the Mascoma River main stem. The brooks and streams in the Mascoma River CFA provide cold water habitat for Eastern brook trout, a PRRC species and conservation priority for the Service’s Northeast Region.

4. Wetlands

The Mascoma River CFA contains 2 acres of hardwood swamp, 429 acres of conifer swamp, 276 acres shrub-swamp and floodplain forest, 18 acres of peatland and 99 acres of freshwater marsh. Many of these wetlands occur along slow moving streams or small ponds. Habitat patches range from 2 acres to 124 acres in size.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and native species will dominate. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, and ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and clear aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six, priority public uses: wildlife observation, wildlife photography, environmental education, interpretation, hunting, and fishing.

Were there other special considerations in delineating the CFA boundary?

- The CFA comprises a large portion of a priority matrix forest block identified in The Nature Conservancy's Lower New England-Northern Piedmont Ecoregional Plan.
- This area was identified as a conservation focus area priority in the Quabbin-to-Cardigan Collaborative Conservation Plan.

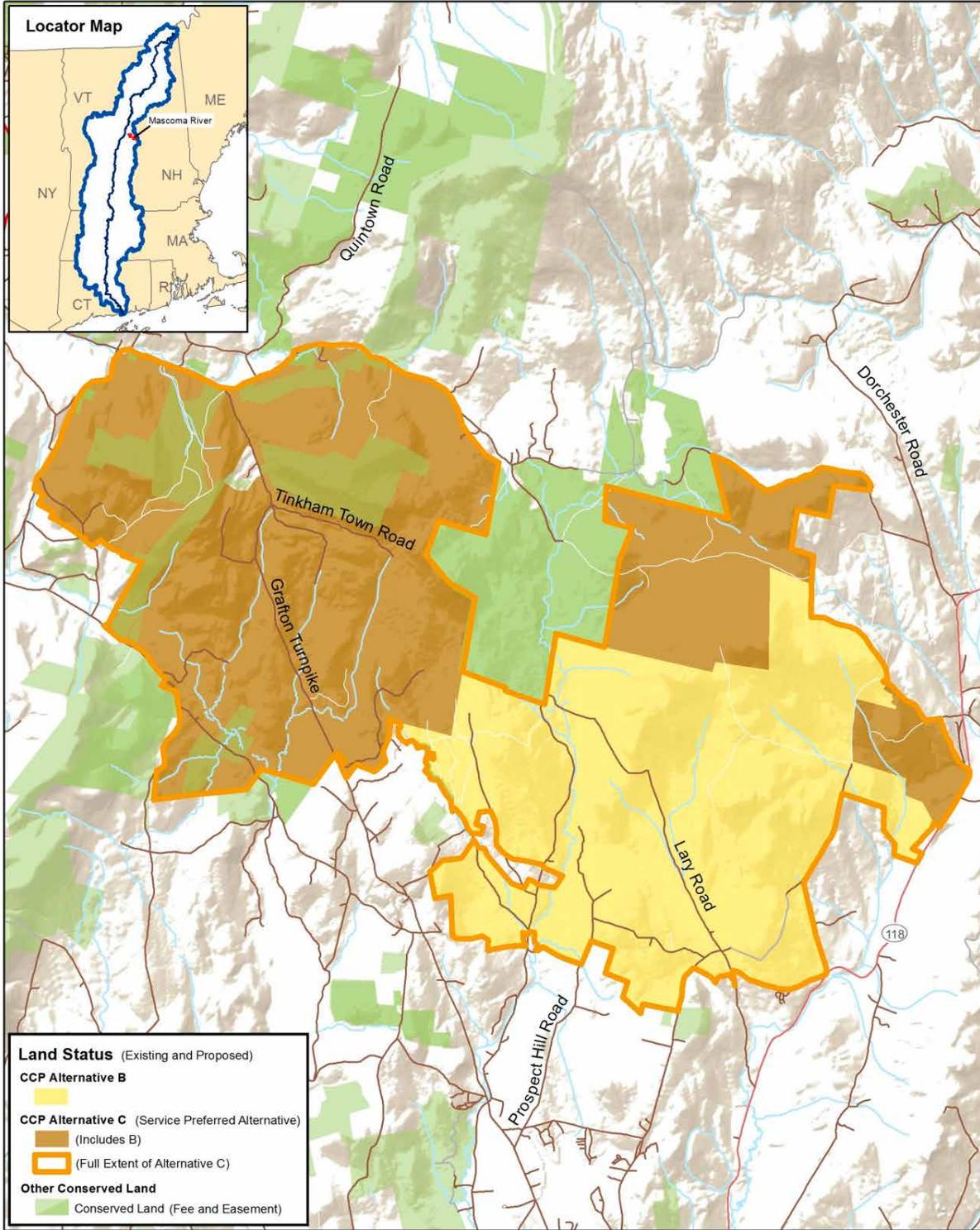
Map A.46. Mascoma River CFA – Location.



U.S. Fish & Wildlife Service

Mascoma River CFA under CCP Alternative C

Silvio O. Conte National Fish and Wildlife Refuge



Land Status (Existing and Proposed)

CCP Alternative B

CCP Alternative C (Service Preferred Alternative)

(Includes B)

(Full Extent of Alternative C)

Other Conserved Land

Conserved Land (Fee and Easement)

This map is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. The conserved lands layer (2012) was obtained from Trust for Public Land. Other 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: 3/18/2015



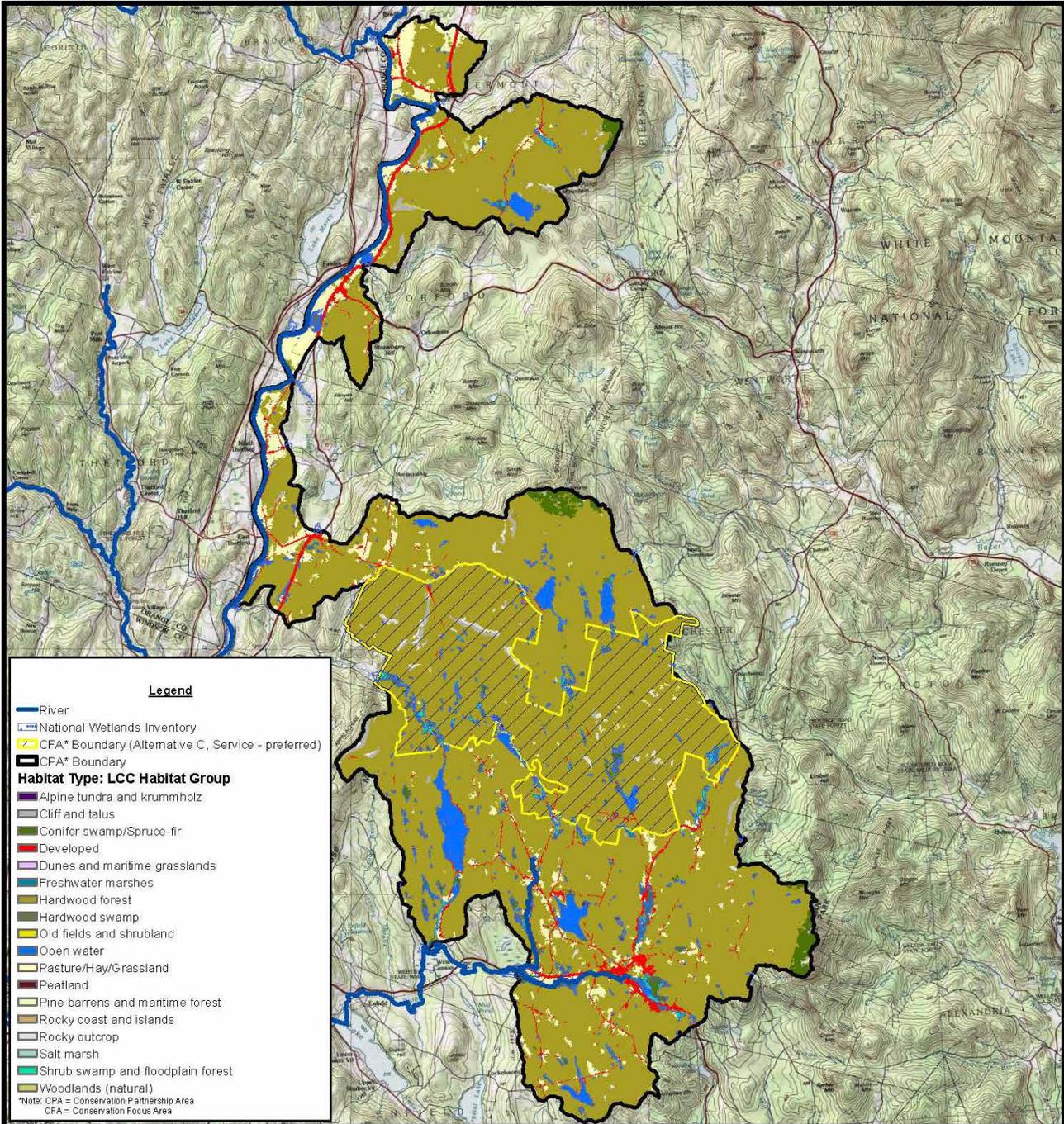
Map A.47. Mascoma River CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Mascoma River CPA* - NH

Silvio O. Conte National Fish and Wildlife Refuge



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Date: 7/2/2013



Table A.35. Mascoma River CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands⁹							
Conifer swamp/spruce-fir	2,560	2.8%	429	33	0	1.9%	16.8%
Hardwood forest	77,212	83.2%	20,868	1,742	0	92.5%	27.0%
Hardwood swamp	98	0.1%	2	0	0	0.0%	2.3%
Shrub swamp and floodplain forest	778	0.8%	276	42	0	1.2%	35.5%
Woodlands (natural)	143	0.2%	12	0	0	0.1%	8.4%
<i>Forested uplands and wetlands subtotal</i>	<i>80,792</i>	<i>87.0%</i>	<i>21,588</i>	<i>1,817</i>	<i>0</i>	<i>95.7%</i>	<i>26.7%</i>
Non-forested Uplands and Wetlands⁹							
Cliff and talus	746	0.8%	233	82	0	1.0%	31.2%
Freshwater marshes	398	0.4%	99	7	0	0.4%	24.9%
Pasture/hay/grassland	4,634	5.0%	103	6	0	0.5%	2.2%
Peatland	65	0.1%	18	0	0	0.1%	27.2%
Rocky outcrop	601	0.6%	280	85	0	1.2%	46.5%
<i>Non-forested uplands and wetlands subtotal</i>	<i>6,443</i>	<i>6.9%</i>	<i>732</i>	<i>179</i>	<i>0</i>	<i>3.2%</i>	<i>11.4%</i>
Inland aquatic habitats⁹							
Open Water	2,888	3.1%	96	4	0	0.4%	3.3%
<i>Inland aquatic habitats subtotal</i>	<i>2,888</i>	<i>3.1%</i>	<i>96</i>	<i>4</i>	<i>0</i>	<i>0.4%</i>	<i>3.3%</i>
Other							
Developed	2,701	2.9%	153	10	0	0.7%	5.7%
<i>Other subtotal</i>	<i>2,701</i>	<i>2.9%</i>	<i>153</i>	<i>10</i>	<i>0</i>	<i>0.7%</i>	<i>5.7%</i>
TOTAL	92,825	100.0%	22,568	2,011	0	100.0%	24.3%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Content/habit_ve_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; represented Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5 - Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.36. Mascoma River CFA – Preliminary Priority Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 20,868 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	Red-shouldered Hawk ^{L, J} Bobcat ^I Ovenbird^A Eastern Wood Pewee ^{A, J} Veery ^A Northern Flicker ^{A, J}
American Woodcock ^{A, B, C}	Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Yellow-bellied Sapsucker ^A Rose-breasted Grosbeak ^A Eastern Red Bat^I Louisiana Waterthrush American Redstart ^{A, J} Black-and-white Warbler ^J Black-billed Cuckoo ^{A, J} Black-throated Blue Warbler ^A
Chestnut-sided Warbler^{A, B, I}	Early successional deciduous forested upland and wetland habitat (Dunn et al, 1997, Richardson et al, 1995)	Black-throated Blue Warbler ^A Great-crested Flycatcher ^J Northern Goshawk ^{A, I, J}
Blackburnian Warbler ^A	Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004).	Red-shouldered Hawk ^{L, J} Scarlet Tanager ^J Sharp-shinned Hawk ^J Purple Finch ^{A, I} Ruffed Grouse ^A
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Black Racer ^I
Hardwood Swamp⁵ – 2 acres		
North-Central Appalachian acidic swamp ^H	<i>North-Central Appalachian acidic swamps</i> are found in basins or on gently sloping seepage lowlands. Eastern hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus Sphagnum are an important component of the moss layer (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Conifer Swamp⁵ – 429 acres		
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Black-throated Green Warbler ^A Blackburnian Warbler ^A Northern Parula ^A Veery ^A Purple Finch ^{A, I}
Shrub Swamp and Floodplain Forest⁵ - 276 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Warbling Vireo Willow Flycatcher Ruffed Grouse ^A Chestnut-sided Warbler ^A Veery ^A American Redstart ^A Canada Goose ^J Mallard ^J Wood Duck ^J Eastern Kingbird ^J Gray Catbird ^J Wood Turtle^I Spotted Turtle^I
American Woodcock ^{A, B, C}	Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	
Woodlands (natural)⁵ - 12 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer, others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Cliff and Talus⁵ – 223 acres		
Peregrine Falcon ^{C, G}	Nests on cliffs, ledges, and talus slopes near open habitats including rivers, lakes, and marshes, and lack of human disturbance (DeGraaf et al. 2001).	Uncommon plant community within the landscape that contributes to BIDEH*
Freshwater Marshes⁵ - 99 acres		
American Black Duck^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	American Bittern^{A, I} Marsh Wren Virginia Rail^I Great Blue Heron ^I Wood Duck ^{A, J} Canada Goose ^J Mallard ^J Wood Turtle ^I Common Loon ^{A, I} Spotted Turtle ^I
Pasture/Hay/Grassland⁵ – 103 acres		
American Woodcock ^{A, B, C}	Roosting habitat includes old fields with scattered tall herbaceous vegetation and/or shrubs. Herbaceous openings such as log landings and pasture used for singing grounds (Kelley et al. 2008, Sepik et al. 1994).	Field Sparrow ^J Northern Harrier ^{A, I, J} Bobolink^A Grasshopper Sparrow^I Eastern Meadowlark^I

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Peatland⁵ – 18 acres		
<p>Boreal-Laurentian-Acadian acidic basin fen^H</p> <p>Laurentian-Acadian acidic alkaline fen^H</p>	<p><i>Boreal-Laurentian-Acadian acidic fens</i> have developed in open or closed relatively shallow basins with nutrient-poor and acidic conditions. The substrate is sphagnum, and vegetation typically includes areas of dominance by grasses and dwarf-shrubs. Leatherleaf is usually present, and scattered stunted trees may occur. These fens often develop adjacent to open water. <i>Laurentian-Acadian acidic alkaline fens</i> are most abundant in areas of limestone bedrock, and widely scattered in areas where calcareous substrates are scarce. Shore fens, which are peatlands that are occasionally flooded along stream and lakeshores, are also included here because flooding tends to create moderately alkaline conditions. The vegetation may be grass-dominated, shrub-dominated, or a patchwork of the two; shrubby cinquefoil is a common diagnostic shrub. The herbaceous flora is usually species-rich and includes calcium loving grasses and forbs. Sphagnum dominates the substrate; star campylium moss is an indicator bryophyte. The edge of the basin may be shallow to deep peat over a sloping substrate, where seepage waters provide nutrients (Gawler 2008).</p>	<p>Uncommon plant community within the landscape that contributes to BIDEH*</p>
Forested Uplands and Wetlands⁴		
Rocky Outcrop⁵ – 280 acres		
<p>Northern Appalachian-Acadian rocky heath outcrop^H</p>	<p>The Northern Appalachian-Acadian rocky heath outcrop system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including Sheep laurel, Low-bush blueberry, Black huckleberry, and Black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008).</p>	<p>Uncommon plant community within the landscape that contributes to BIDEH*</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 96 acres		
Brook Trout^{B, F}	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	Slimy Sculpin ^I Wood Turtle ^I
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Canada Goose ^A Wood Duck ^A Hooded Merganser ^J Green-winged Teal ^J Mallard ^J Great Blue Heron ^I Common Merganser Ring-necked Duck Common Loon^{A, I}

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

- A: 2008 Bird Conservation Region 14.
- B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.
- C: 2008 USFWS Birds of Conservation Concern.
- D: Federal Threatened and Endangered status as of 2010, including Candidate Species
- E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010
- F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan
- G: Silvio O Conte Refuge Purpose Species.
- H: 2008 North East Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

- A: 2008 Bird Conservation Region 14.
- I: 2006 New Hampshire Wildlife Action Plan (Species of Greatest Concern)
- J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Mascoma River CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Conifer Swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Mascoma River CFA, softwood swamps frequently have been altered and have potential for restoration. This habitat type is often found in small patches on mineral soils that are nutrient poor; there may be an organic layer, but generally deep peat soils are absent. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. The dynamic nature of the watertable drives complexes of forest upland and wetland species including red maple, balsam fir, red spruce, and ash species. Where soils tend more to alkaline conditions white cedar is a common tree species, and the shrub layer is generally more diverse. Within the Connecticut River watershed, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats.

Successional trends in softwood swamps are not well understood. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within Mascoma will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aide in the restoration of historical species mixtures.

Where needed, restoration of softwood swamp habitats will create high-quality habitat for neotropical migratory birds. Closed canopy softwood forests that include white cedar and other softwoods provide important mast, food, nesting, and cover. Softwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blowdowns create canopy gaps. This provides a well developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Conifer swamps in the Mascoma River CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Conifer swamp patches of 10 acres or greater are thought to provide suitable breeding habitat for Canada warbler in the Mascoma River CFA, and allow monitoring of population response to management actions (R. Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of conifer swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve forest structure, species composition, and/or ecological function. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of New Hampshire, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve forest structure, species composition, and/or ecological function. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, chestnut-sided warbler, American woodcock, Canada warbler, and blackburnian warbler.

Rationale:

We envision healthy forests within the Mascoma River CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of New Hampshire’s wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D’Amato et al. 2009, Curzon and Keeton 2010). This large, contiguous block of matrix forest has been identified by a host of partners including the State of New Hampshire’s Wildlife Action Plan, the Nature Conservancy’s Lower New England-Northern Piedmont Ecoregional Plan, and the Quabbin-to-Cardigan Collaborative Conservation Plan.

Within the Mascoma River CFA and the watershed there are several large areas of unfragmented forest. These areas serve as refugia for wildlife, which has led the establishment of multiple wildlife management areas in the watershed. To date our review of Mascoma River’s habitats and wildlife species —and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance

and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Mascoma River comes exclusively from a reading of forest history in New England—a legacy of intensive past-use has altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of Mascoma River are remarkably more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach combining passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Mascoma River will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided warbler, ruffed grouse, and—if wetlands and riparian areas are present—Canada warbler (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009).

Mascoma River's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and blackburnian warbler. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for blackburnian warblers, who are thought to be strongly associated with the hemlock forests within Mascoma River—and have been shown to decline in response to removal of hemlock by hemlock wooly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Close canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and—when along rocky bottomed streams—Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure, species composition, and/or ecological function. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.
- Identify forest stands where soils and species composition will support woodcock management.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges’ “biological integrity, diversity, and environmental health” (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem’s current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted

climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003) The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complimented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Mascoma River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1d. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American woodcock and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock and American black duck, priority refuge resources of concern.

American woodcock are dependent on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Shrub swamps in the CFA may provide moist, rich soils for foraging and the dense shrubs provide cover from predators.

Management of the shrub swamp communities may be required to maintain shrub dominance and stem densities. Tree species, such as red maple, tend to replace mature shrub species and established invasive plants compete for nutrients and space. These invading species require management in order to maintain the native shrub diversity of the community. A high shrub stem density is also important as it provides birds with cover from predators and more leaf surface area for gleaning. Cover for American woodcock, for example, is ideal in a 10-15 year old shrub swamp (USDA 2001). Shrub species, in particular alder, tend to die back as they reach maturity, and as a result stem density decreases. Periodic rejuvenation of shrubs is necessary to maintain required stem densities. Management priority will be given to shrub swamps that are part of a woodcock management area. Management of these shrub swamps will benefit other species that use these communities, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation, and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests near foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.

- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily, and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams (Gawler 2008). These marshes are also maintained over time by beaver activity, an important natural disturbance process within the Mascoma River watershed.

Our coarse-scale habitat analysis of this CFA identifies these wetlands as scattered throughout the CFA, with a large percent occurring along Pressey Brook. This particular wetland complex, adjacent to a slow moving stream, may provide important breeding and foraging habitat for American black duck, and other waterfowl species. This area may also be important as staging areas for migrating waterfowl. An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for waterfowl species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA. Baseline information on the condition of freshwater marshes at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Encourage local landowners to use New Hampshire Best Management Practices within active agricultural fields that are located along the perimeter of marsh habitats.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Map natural communities; protect rare or exemplary examples.
- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Survey wildlife use of existing wetlands.

Sub-objective 1.2b. (Cliff and Talus)

Protect cliffs, ledges and talus slopes to maintain the biological integrity, health and diversity of associated natural and rare ecological communities. Emphasis will be on sites occupied by nesting peregrine falcons.

Rationale:

Cliff and talus systems in this CFA generally occur below treeline at low to mid elevations. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places (Gawler 2008). The type of rock, microclimate, and soil availability from higher elevation sources directly and indirectly influence vegetation within these systems (Thompson and Sorenson 2000). Rock types may include limestone, dolomite, granite, schist, slate, or shale which breakdown differently in the environment providing varying levels of nutrients, moisture, ground stabilization, and soil availability. Sun exposure, aspect, elevation, and moisture provide different microclimate conditions impacting vegetation type and growth. These systems provide unique niches for rare and uncommon plants, and habitat for snakes, including the rare eastern timber rattlesnake,

black rat snake, and eastern garter snake. Exposed cliffs provide nesting habitat for turkey vultures, ravens, porcupines, and peregrine falcons, a state species of greatest conservation need. Peregrine falcons are also a refuge purpose species. New Hampshire's breeding population has increased steadily since they were extirpated from the Eastern US in the mid to late 1960's due to indiscriminate use of DDT following World War II. Peregrines nest on Holts Ledge in the Mascoma River CFA. Winslow Ledge, located across the valley from Holts Ledge, may provide an alternate nest site for peregrines. Monitoring and management of these sites is coordinated by New Hampshire Audubon.

Management of cliff and talus systems in the Mascoma River CFA will begin with a comprehensive, multi-scale wildlife and habitat inventory. Wildlife species survival and breeding success is dependent on habitat at a fine scale and the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of cliff and talus systems at the time of acquisition, and communication and coordination with our partners, will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with New Hampshire Audubon and other partners to evaluate and manage human (e.g. recreational) influences, and conduct outreach and education as necessary.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Identify historical, active, and potential peregrine falcon nesting sites.
- Coordinate with New Hampshire Audubon and other conservation organizations to conduct spring surveys of identified sites to determine occupancy.
- Work with New Hampshire Audubon and other partners to annually monitor active sites to determine occupancy status and reproductive outcome.

Sub-objective 1.2c. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) as part of a mosaic of habitat conditions required by American woodcock and other shrub-dependent conservation concern species such as chestnut-sided warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

Less than one percent of the Mascoma River CFA is typed as pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing "old field" habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow. American woodcock, a refuge priority resource of concern, will use both habitat conditions when managed in conjunction with their other habitat needs.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However,

large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Shrubland and grassland habitats will also be used by American woodcock, which require diverse structural habitat conditions within close proximity of each other: clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young hardwood forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Small clearings with minimal vegetation is required for courtship areas, and shrublands with clumps of tall vegetation or sparse shrubs will provide roosting habitat.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, and grassland acres can provide quality habitat, for these species, and American woodcock, if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of pasture, hay and grassland habitats to determine their condition, size and location, and incorporate them into the management strategies for American woodcock in the HMP.

Sub-objective 1.1d. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987; Hunter 1991; Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation

plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Mascoma River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook. Also provide undisturbed breeding, foraging and stopover habitat for American black duck and other waterfowl species.

Rationale:

The Mascoma River watershed supports high water quality streams that are pristine with minimal impacts from human influences. The Mascoma River CFA supports numerous minimally developed ponds, perennial and intermittent streams, and river habitats, including the Mascoma River. The brooks and streams in the Mascoma River CFA provides cold water habitat for eastern brook trout, a species of conservation concern for the State and the Service’s Northeast Region.

Mudgetts Pond, Larry Pond, and Little Clark Pond are secluded and surrounded by wetlands, and may provide undisturbed breeding, foraging and stopover habitat for a variety of waterfowl species including wood duck, American black duck, Canada goose, mallard, green-winged teal, ring-necked ducks and mergansers. Common loons, a state species of greatest conservation need are known to nest in the Mascoma River CFA.

Management of water resources in the Mascoma CFA will provide clear aquatic species passage to spawning and wintering habitat, structurally diverse instream habitat, with boulders and downed woody debris providing riffles and pools, and shade trees along riparian edges. Open water habitats will remain pristine and undeveloped.

Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Aquatic species survival and breeding success is dependent on not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent forest conditions and land uses within the CFA and associated landscape. Baseline information on the condition of the water resources in the CFA at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Work with partners to implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate stream and fish community health.
- Work with partners to identify man-made physical barriers (e.g. impassable road crossings, culverts and dams) to the movement of fish and other aquatic organisms.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Mascoma River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Mascoma River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Mascoma River Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Mascoma River Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Mascoma River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the Mascoma River Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Mascoma River Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Mascoma River Division.

- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See the rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Mascoma River Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Mascoma River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Mascoma River Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

The Mascoma CFA is a popular area to hunt white-tailed deer, moose, Eastern wild turkey, black bear, and small game. Hunting would be allowed on a newly created division as long as it is found to be a compatible use. Hunting, consistent with the final compatibility determination, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
 - (a) The season for hunting snowshoe hare and coyotes with dogs is from October 1 to March 15.
 - (b) Use of bait is prohibited.
 - (c) Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

- Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with New Hampshire Fish and Game Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Mascoma River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.
- Work with New Hampshire Fish and Game Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Mascoma Division after completing all administrative procedures to officially open refuge lands to fishing, based on New Hampshire Fish and Game Department regulations, and any division-specific conditions.

Rationale:

There are several streams in the proposed CFA including the Mascoma River, Tinkhamtown Brook, Indian River, and Call Brook. The Mascoma River supports a cold water fishery with brook trout, brown trout, and rainbow trout. A variety of game fish are found in the other streams of the CFA. Fishing is a popular activity throughout this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The Mascoma Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land with fishable waters:

- Work with the New Hampshire Fish and Game Department to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. Local organizations such as the Mascoma Chapter of New Hampshire Audubon and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring sufficient land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring sufficient land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring sufficient land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.

- Encourage local schools and groups such as the Mascoma Chapter of New Hampshire Audubon and other environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring sufficient land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Mascoma River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Mascoma River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource. Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Within 5 years of acquiring land containing a section of the Appalachian Trail:

- Work with the State of New Hampshire, the Appalachian Trail Conservancy, adjacent landowners, and other local interests to explore partnership opportunities related to the trail and the surrounding network of conserved lands in the CPA.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Mascoma River Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Work with users to delineate winter cross-country skiing trails and determine whether a special use permit to manage winter trails is warranted.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of acquiring sufficient land:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units

Overview Pondicherry Conservation Focus Area (Existing Refuge Division)

Whitefield, Jefferson, and Carroll, New Hampshire

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	10,242	100 %
<ul style="list-style-type: none"> ■ Existing Refuge Ownership in CFA¹ ■ Additional Acres in CFA proposed for Refuge Acquisition² 	6,405	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	0	0 %
Total Acres in CFA ^{2,4}	10,242	100 %

¹Acres from Service’s Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The existing Pondicherry Division was established in 2000 and is now over 10 square miles in area. The CFA includes the State of New Hampshire’s first designated IBA, a National Natural Landmark, and two National Recreation Trails. The proposed expansion to the existing division would help better protect the headwaters of Johns River and provide connectivity between White Mountains National Forest and the Pondicherry wetlands complex by connecting the lower elevation wetlands in the CFA to the upland slopes that feed into it.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Conifer Swamp/Spruce-fir – 57.7%
- Peatlands – 6.4%
- Shrub Swamps and Floodplain Forest - 5.1%

For more information about habitats in the CFA, see map A.52 and table A.37.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.38 below, there are eight Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that rely upon the diverse habitats in this CFA. There are also PRRC habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the potential value of this area to Canada lynx, a federally listed species recently confirmed breeding in northern New Hampshire, and to State Species of Greatest Conservation Need (SGCN).

1. Federal Threatened and Endangered Species

Canada lynx have been confirmed breeding in northeastern New Hampshire by New Hampshire Fish and Game Department, and lynx tracks have been detected near the Pondicherry CFA. Conservation efforts for this species should be done at the landscape scale, and additional information is necessary to evaluate the importance of New Hampshire for Canada lynx and those measures needed to ensure their

persistence within the State. Monitoring lynx presence and use of habitats in the Pondicherry CFA, therefore, is a priority, and coordination with New Hampshire Fish and Game Department will allow for a standardized approach.

A bat acoustic survey in 2013, conducted by the USFWS, detected the presence of little brown bats, a species that is being assessed for candidate status under the ESA. Stationary acoustic equipment were deployed at various locations and habitats of the Pondicherry Division, recording almost 500 little brown bat calls. Other bats detected during this inventory included hoary bat, silver-haired bat, big brown bat and eastern red bat. Little brown bats, and other cave dwelling species, have experienced drastic population declines due to effects from the fungal disease white-nose syndrome.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Pondicherry CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat for a diversity of bird species.

The importance of Pondicherry to birds has been officially recognized several times. In 1963, New Hampshire Audubon and the New Hampshire Fish and Game Department collaborated to establish the Pondicherry Wildlife Sanctuary, comprised of Cherry and Little Cherry ponds and 166 acres of shoreline. The National Park Service recognized Pondicherry in 1972 for its "...relatively stable bog-forest supporting an unusual variety of birdlife" by naming it a National Natural Landmark. In 2003 the Division and the adjacent Mount Washington Regional Airport were designated the first Important Bird Area in New Hampshire.

The complex ecosystem of bogs, ponds, streams and wetlands surrounded by spruce and fir boreal forests supports approximately 238 species of birds, of which 129 species have been confirmed as breeding. Five years of breeding landbird survey data, and countless observations made by expert birders have detected numerous species of high conservation concern. Many of these species are resident and migratory boreal species including boreal chickadee, black-backed woodpecker, spruce grouse, gray jay, bay-breasted warbler, rusty blackbird, blackpoll warbler, and olive-sided flycatcher. The contiguous forests also provide habitat for forest interior species such as Canada warbler, ovenbird, blackburnian warbler, black-throated blue warbler, and black-throated green warbler. Blackburnian warbler, Canada warbler and black-throated blue warbler are PRRC species that require different species composition and structure within a mature forest. While American woodcock and rusty blackbird, also PRRC species, rely on early successional forests in the CFA.

The secluded ponds and associated wetlands in the CFA provide habitat for various waterbirds including Virginia rail, great blue heron, and American bittern. Cherry Pond is also one of the State's key common loon territories, fledging an average of one chick per year per pair.

3. Waterfowl

Cherry and Little Cherry Pond, and associated wetlands provide important breeding and foraging habitat for American black duck, a PRRC species, and other waterfowl species such as ring-necked duck, wood duck, hooded mergansers, and green-winged teal. Cherry Pond and Little Cherry Pond are also staging areas for migrating waterfowl, including scaup, bufflehead, gadwall, scoters, and goldeneye.

4. Diadromous fish and other aquatic species

Open water habitats in the Pondicherry CFA are limited to Cherry Pond, Little Cherry Pond, Mud Pond, the John's River and its tributaries, and Stanley Brook. These habitats support several fish species one of which, the Eastern brook trout, is a PRRC and has been identified as a conservation priority for the Service's Northeast Region. Brook trout are found in cold headwater rivers and streams. Wild brook trout have been documented within the CFA, and many streams, including Carroll Stream, are suitable to be managed as a self-sustaining wild brook trout population. Other species documented from Pondicherry

include chain pickerel and several perch species from Cherry Pond, and state species of concern including burbot (cusk), northern redbelly dace, slimy sculpin, and tessellated darter from riverine habitats.

5. Wetlands

The Pondicherry CFA lies about 1,110 feet above sea-level in a three-sided basin, surrounded to the north, east, and south by peaks rising from 5,000 feet (Pliny Range) to 5,580 feet (Presidential Range) above the basin. It is not surprising that more than seven percent of the CFA consists of wetland habitats. About 537 acres of shrub swamp and floodplain forest, and 667 acres of peatlands make up the majority of the wetland habitat. These wetlands are concentrated along the perimeter of Cherry and Little Cherry Ponds, and the John's River.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and management actions will aim to maintain forest types and structures appropriate for site conditions and location (i.e. soils and aspect). Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, and ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse in-stream habitat, and unimpeded aquatic species passage to spawning and wintering habitat.

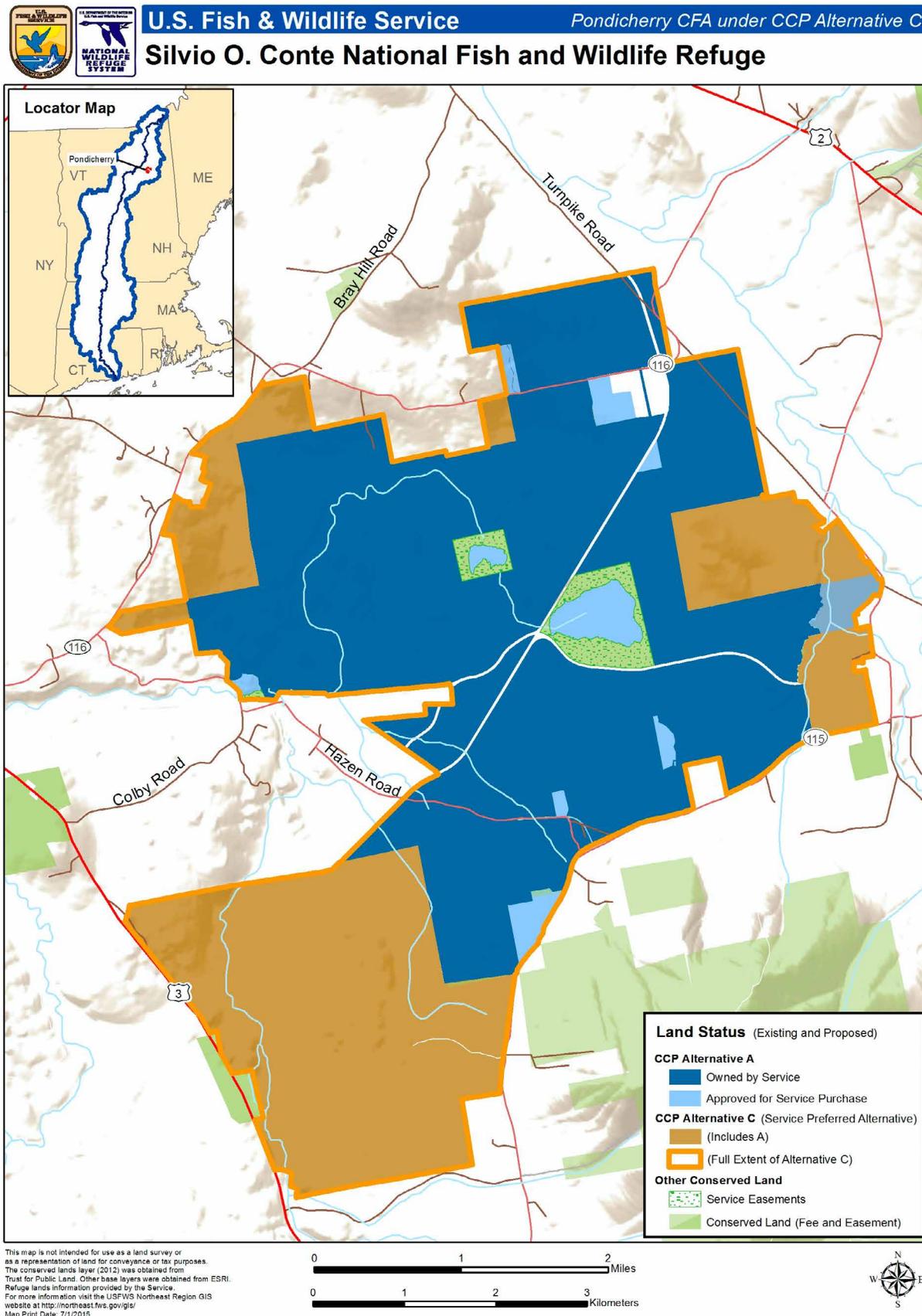
What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

Our priority would be providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, environmental education, and interpretation. See map A.49 for more information on proposed additional public use infrastructure.

Were there other special considerations in delineating the CFA boundary?

In 1974, land within the basin also was recognized as a National Natural Landmark by the National Park Service. In 2003, the Pondicherry Division was designated as the State's first Important Bird Area--an international program which uses scientific criteria to identify habitat important to birds.

Map A.48. Pondicherry CFA – Location.

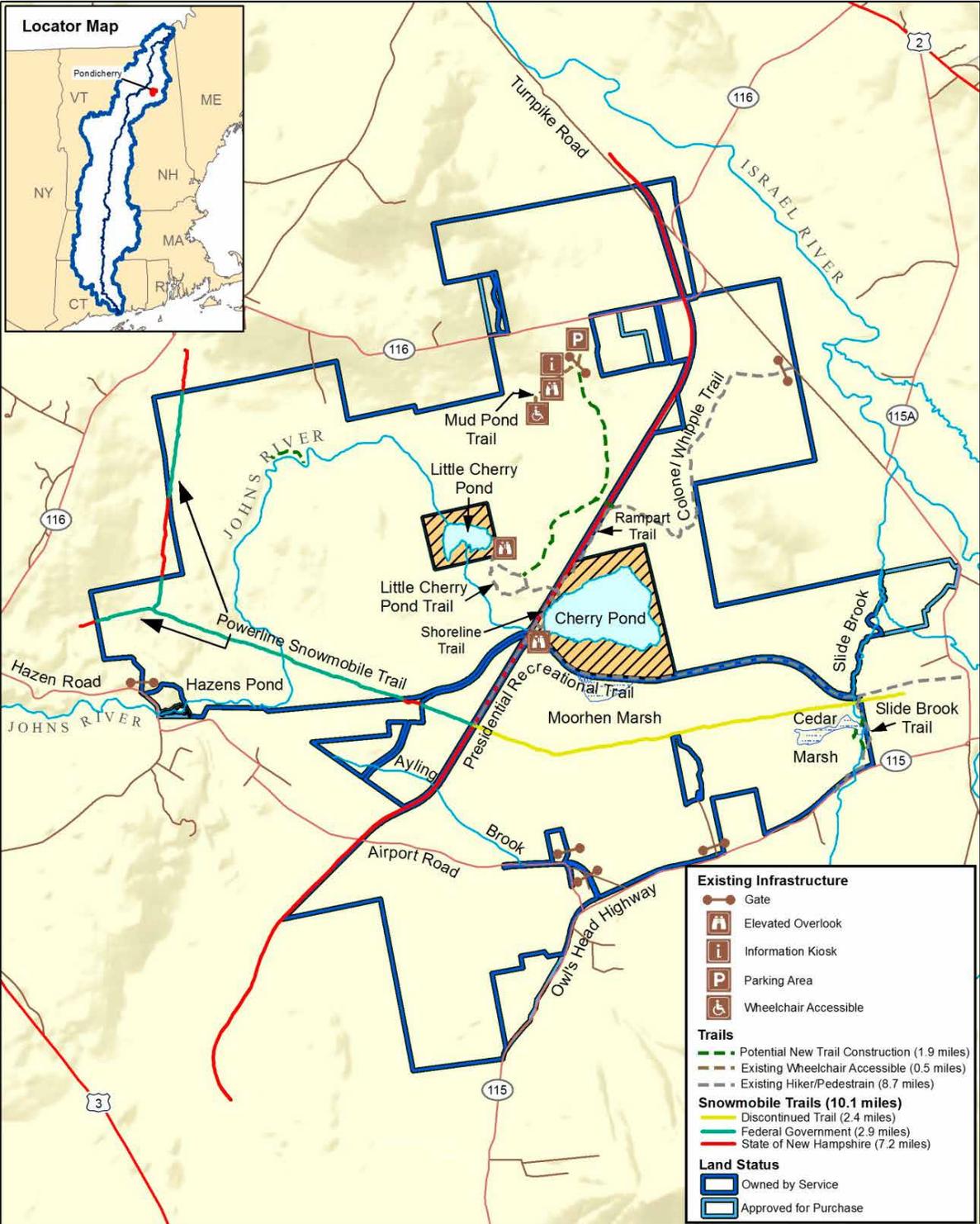


Map A.49. Pondicherry CFA – Proposed Public Access.



U.S. Fish & Wildlife Service Alternatives A, B and C - Proposed Access - Pondicherry Division

Silvio O. Conte National Fish and Wildlife Refuge



Existing Infrastructure

- Gate
- Elevated Overlook
- Information Kiosk
- Parking Area
- Wheelchair Accessible

Trails

- Potential New Trail Construction (1.9 miles)
- Existing Wheelchair Accessible (0.5 miles)
- Existing Hiker/Pedestrian (8.7 miles)

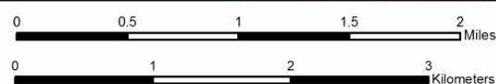
Snowmobile Trails (10.1 miles)

- Discontinued Trail (2.4 miles)
- Federal Government (2.9 miles)
- State of New Hampshire (7.2 miles)

Land Status

- Owned by Service
- Approved for Purchase

This map is designed for refuge management. It is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. For more information visit the USFWS Northeast Region GIS website at <http://northeast.fws.gov/gis/> Map Print Date: 3/24/2015



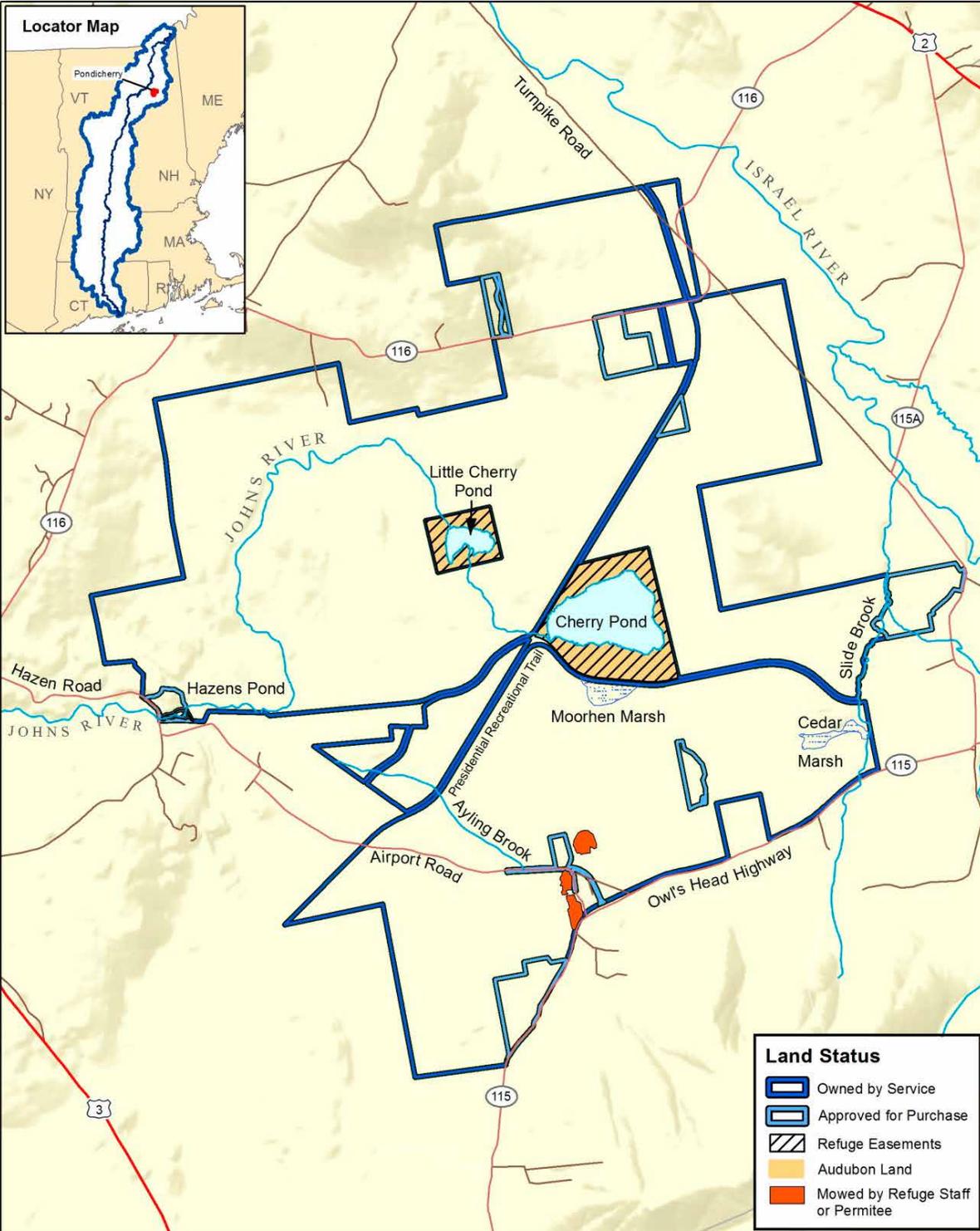
Map A.50. Pondicherry CFA – Fields Mowed and Hayed.



U.S. Fish & Wildlife Service

Mowed Fields at Pondicherry Division

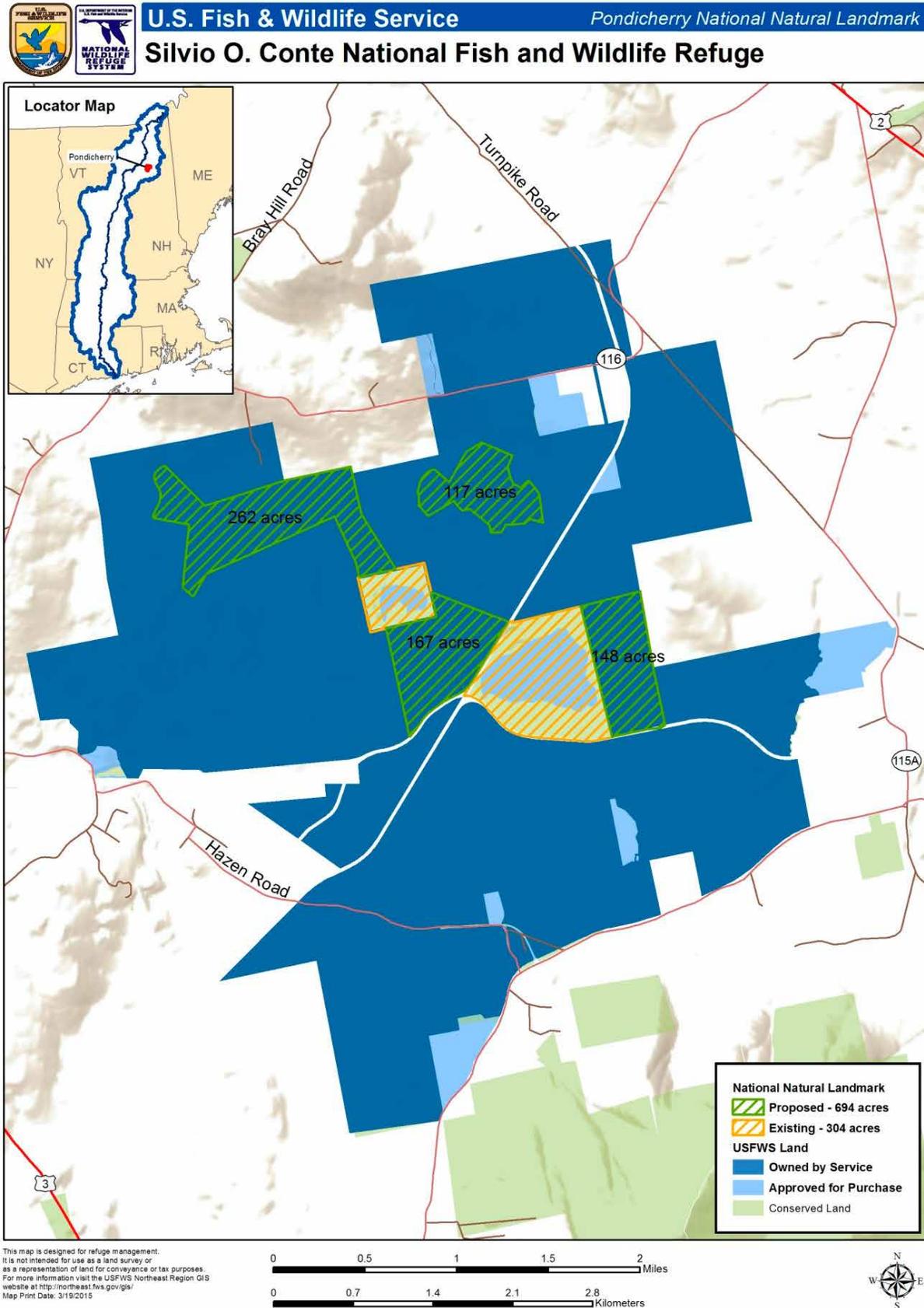
Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management. It is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. For more information visit the USFWS Northeast Region GIS website at <http://northeast.fws.gov/gis/> Map Print Date: 3/19/2015



Map A.51. Pondicherry CFA – Proposed Expansion to National Natural Landmark.



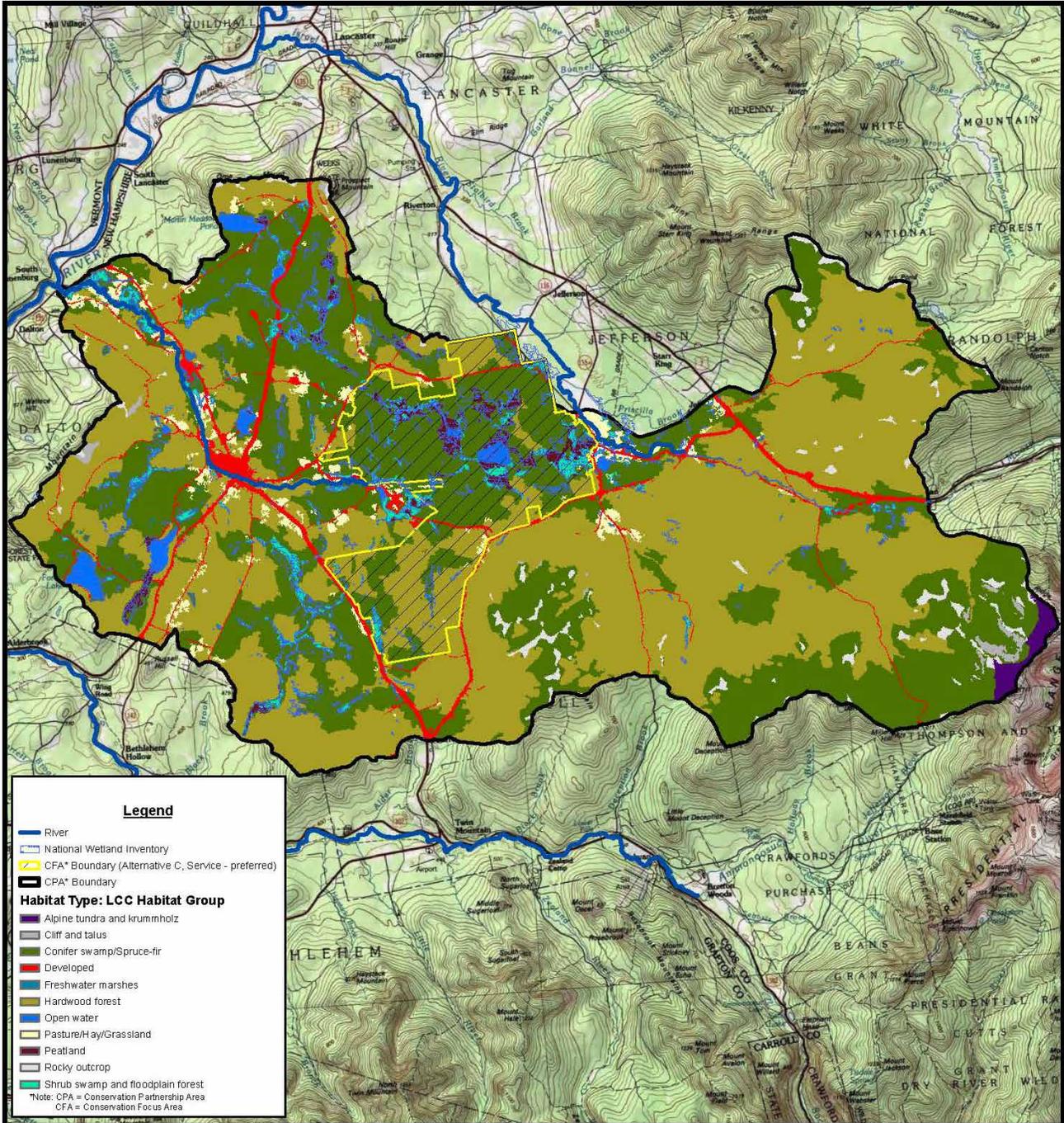
Map A.52. Pondicherry CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Pondicherry CPA* - NH

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management. It is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. For more information visit the USFWS Northeast Region GIS website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013



Table A.37. Pondicherry CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands⁹							
Conifer swamp/spruce-fir	31,662	37.4%	6,056	6	4,297	57.7%	19.1%
Hardwood forest	41,941	49.6%	2,827	9	996	26.9%	6.7%
Shrub swamp and floodplain forest	1,799	2.1%	537	0	353	5.1%	29.8%
<i>Forested uplands and wetlands subtotal</i>	<i>75,403</i>	<i>89.1%</i>	<i>9,420</i>	<i>14</i>	<i>5,646</i>	<i>89.7%</i>	<i>12.5%</i>
Non-forested Uplands and Wetlands⁹							
Alpine tundra and krummholz	402	0.5%	0	0	0	0.0%	0.0%
Cliff and talus	312	0.4%	0	0	0	0.0%	0.0%
Freshwater marshes	387	0.5%	66	2	38	0.6%	17.0%
Pasture/hay/grassland	1,752	2.1%	49	1	28	0.5%	2.8%
Peatland	1,027	1.2%	667	0	578	6.4%	65.0%
Rocky outcrop	1,151	1.4%	0	0	0	0.0%	0.0%
<i>Non-forested uplands and wetlands subtotal</i>	<i>5,030</i>	<i>5.9%</i>	<i>782</i>	<i>3</i>	<i>643</i>	<i>7.4%</i>	<i>15.5%</i>
Inland aquatic habitats⁹							
Open Water	786	0.9%	136	0	10	1.3%	17.3%
<i>Inland aquatic habitats subtotal</i>	<i>786</i>	<i>0.9%</i>	<i>136</i>	<i>0</i>	<i>10</i>	<i>1.3%</i>	<i>17.3%</i>

LCC General Habitat Type ¹	CPA ²		CFA ³				
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	Percent Habitat ⁸
Other							
Developed	3,372	4.0%	163	0	90	1.6%	4.8%
<i>Other subtotal</i>	<i>3,372</i>	<i>4.0%</i>	<i>163</i>	<i>0</i>	<i>90</i>	<i>1.6%</i>	<i>4.8%</i>
TOTAL	84,591	100.0%	10,501	17	6,390	100.0%	12.4%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.38. Pondicherry CFA – Priority Refuge Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Conifer Swamp/Spruce-fir Forest⁵ - 6,056 acres		
Blackburnian Warbler ^A	Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004).	Cape May Warbler ^{A, J} Boreal Chickadee ^{A, J} Northern Parula ^A Purple Finch ^{A, J}
Rusty Blackbird ^{A, C}	Breeding habitat includes conifer dominated forested wetlands interspersed with shrub swamps and peatlands. Young spruce and fir may be required for nesting (Greenland et al, 2010, Powell et al., 2010, and Matsuoka et al, 2010).	Black-throated Green Warbler ^{A, J} Spruce Grouse ^{A, I} American Marten ^I Canada Lynx ^{I, J} Gray Jay ^{A, I, J}
Little Brown Bat ^E	Feeding areas include wetlands, riparian habitat and open water. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (Degraaf et al, 2001, and Darling Guidelines, unpublished).	Black-backed Woodpecker ^{A, I, J} Bay-breasted Warbler ^{A, I, J} White-throated Sparrow Blackpoll Warbler ^{A, I} Brown Creeper ^J Northern Saw-whet Owl ^J Olive-sided Flycatcher ^{A, I, J} Palm Warbler ^{A, J}
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft. within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Pine Grosbeak ^{A, J} Sharp-shinned Hawk ^J Yellow-bellied Flycatcher ^J
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 2,827 acres		
American Woodcock ^{A, B, C}	Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Ruffed Grouse ^{A, I} Whip-poor-will ^{A, I, J} Smooth Green Snake ^I Canada Lynx ^I Chestnut-sided Warbler ^{A, I} Ovenbird ^A
Black-throated Blue Warbler ^A	Breeding habitat includes mature deciduous and mixed deciduous/conifer forests with a shrubby understory (Degraaf et al. 2001, Hodgman et al. 2000, Dobbs 2007, Dunn et al. 1997)	Eastern Red Bat ^I Northern Parula ^A American Redstart ^{A, J} Black-and-white Warbler ^J Black-throated Green Warbler ^A
Little Brown Bat ^E	Feeding areas include wetlands, riparian habitat and open water. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (Degraaf et al, 2001, and Darling Guidelines, unpublished).	Eastern Wood-pewee ^{A, J} Northern Flicker ^{A, J} Northern Goshawk ^{A, I, J} Red-shouldered Hawk ^{I, J} Sharp-shinned Hawk ^J Yellow-bellied Sapsucker ^{A, J} Purple Finch ^{A, I} Veery ^A
Blackburnian Warbler^A	Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004).	

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 537 acres		
American Woodcock ^{A, B, C}	Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands, and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Chestnut-sided Warbler ^{A, I} Great Blue Heron ^I American Redstart ^{A, J} Eastern Kingbird ^J Gray Catbird ^J Wood Duck ^{A, J} Warbling Vireo Willow Flycatcher Canada Goose ^A Northern Leopard Frog ^I Smooth Green Snake ^I Veery ^A Ruffed Grouse ^{A, I}
Little Brown Bat ^E	Feeding areas include wetlands, riparian habitat and open water. Roosting trees located in forested landscapes clustered in stands of large trees with cavities or loose bark. Cliffs, ledges, talus slopes also important for roosting/nesting. Maternity trees (8"-14" dbh) and travel corridors to water are also important (DeGraaf et al, 2001, and Darling Guidelines, unpublished).	
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 66 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	American Bittern ^{A, I} Marsh Wren Virginia Rail Northern Harrier ^{A, I, J} Common Moorhen ^I Canada Goose ^A Wood Duck ^A Hooded Merganser ^J Green-winged Teal ^J Mallard ^J Great Blue Heron ^I Common Loon ^{A, I}
Pasture/Hay/Grassland⁵ – 49 acres		
American Woodcock ^{A, B, C}	Roosting habitat includes old fields with scattered tall herbaceous vegetation and/or shrubs. Herbaceous openings such as log landings and pasture used for singing grounds (Kelley et al. 2008, Sepik et al. 1994).	Field Sparrow ^J Northern Harrier ^{A, I, J} Chestnut-sided Warbler ^{A, I} Bobolink^A Grasshopper Sparrow^I Eastern Meadowlark^I
Peatland⁵ – 667 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Olive-sided Flycatcher ^{A, I, J} Mink Frog^I Palm Warbler^A Black-backed Woodpecker ^{A, I, J} Northern Harrier ^{A, I, J} Eastern Kingbird ^J

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 136 acres		
Brook Trout^{B, F}	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	Northern Redbelly Dace ^I Slimy Sculpin^I Tessellated Darter ^I
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Canada Goose ^A Wood Duck ^A Hooded Merganser ^J Green-winged Teal ^J Mallard ^J Great Blue Heron ^I Common Merganser Ring-necked Duck Common Loon^{A, I}

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

- A: 2008 Bird Conservation Region 14.
- B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.
- C: 2008 USFWS Birds of Conservation Concern.
- D: Federal Threatened and Endangered status as of 2010, including Candidate Species
- E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010
- F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan
- G: Silvio O Conte Refuge Purpose Species.
- H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

- A: 2008 Bird Conservation Region 14.
- I: 2006 New Hampshire Wildlife Action Plan (Species of Greatest Concern)
- J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Pondicherry CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including black-throated blue warbler; little brown bat, American woodcock, and blackburnian warbler.

Rationale:

This large, contiguous block of matrix forest has been identified as a conservation priority by a host of partners including the State of New Hampshire's Wildlife Action Plan, the Nature Conservancy's Lower New England-Northern Piedmont Ecoregional Plan, and Audubon has designated Pondicherry as an Important Bird Area.

In 1974, land within the basin was recognized as a National Natural Landmark (NNL) by the U.S. National Park Service. Its significance is that it is an exemplary example of an undisturbed boreal forest community that supports an unusually high diversity of birdlife and wetland communities. With additional acquisition of exemplary wetlands in the Pondicherry Division, we are proposing an expansion to this NNL designation. In chapter 4 under "Actions Common to All Alternatives," we describe our proposal and include a map of the existing NNL and its expansion.

In 2003, the Pondicherry Division was designated as the state's first Important Bird Area—an international program which uses scientific criteria to identify habitat important to birds. Its complex ecosystem of bogs, ponds, streams, and wetlands surrounded by spruce and fir boreal forests supports approximately 238 species of birds, of which 129 species have been confirmed as breeding. Following its designation as an important bird area, the Division was expanded by 3,010 acres purchased from Hancock Timber Resource Group.

We envision healthy forests within the Pondicherry CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of New Hampshire's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011). Pondicherry CFA's hardwood forests have long been recognized as being among the most diverse and productive for wildlife, and abundant, high-quality habitat is most certainly available within the CFA. To date, our review of Pondicherry's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, a coarse-scale habitat inventory, and an understanding of forest disturbance and land-use history within the CFA. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Pondicherry comes from a forest-based habitat inventory conducted in 2007 (USFWS, unpublished), and a reading of the recent forest history within the Pondicherry basin—a legacy of intensive past-use has altered the vegetation structure and composition, landscape patterns, and potentially ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective addresses the current hardwood forest condition of Pondicherry which are remarkably more homogeneous than those of three centuries earlier, and species compositions include more sprouting and shade-intolerant species and fewer long-lived mature forest tree

species (USFWS, unpublished). Completing a finer-scale comprehensive forest and habitat inventory will aid in identifying stands where a forest management approach combining passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. Much of the hardwood forest within the Pondicherry CFA was harvested prior to refuge ownership using techniques that produced a structurally homogenous, young forest landscape. While our management goals may create a relatively old forest, hardwood forests within Pondicherry will contain a variety of patches in different age classes and developmental stages; it will not be uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al. 2008). Across the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided warbler, ruffed grouse, bald eagles, and—if wetlands and riparian areas are present—Canada warbler (Lambert and Faccio 2005, Reitsma et al. 2008, Chace et al. 2009).

The structural homogeneity of hardwood forests in Pondicherry has limited important habitat features for refuge priority resources of concern. Pondicherry's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0 to 5 feet in height) are of particular importance. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like black-throated blue warbler and blackburnian warbler. Black-throated blue warbler nest and feed within the shrub layer level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Rosenberg et al. 1999). And blackburnian warbler has significance as a NALCC representative species for hardwood forests in the NALCC northern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for blackburnian warblers, who are thought to be strongly associated with the mixed-wood forests within Pondicherry.

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and northern goshawk.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are largely absent or are very few in the younger forests that characterize Pondicherry, and that has implications for wildlife habitats and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy—provide special habitats that, when near open bodies of water, are utilized by bald eagles. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that use large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Cavity trees may also be used by little brown bats as roosting sites. Female little brown bats raise pups in large maternity colonies within buildings or cavity trees often near wetlands or open water. Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Continue to manage invasive plant species.
- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure, species composition, and/or ecological function. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management
- Work with partners, including the State of New Hampshire, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Retain cavity trees within the vicinity of open water and wetlands to provide maternity sites for little brown bats. Protect bat maternity roosts, if present.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Map natural communities; protect rare or exemplary examples.
- Conduct forest inventories.
- Continue to survey wildlife use including breeding landbirds and bat inventories.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Conifer Swamp/Spruce-fir)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve landscape connectivity of spruce-fir habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including blackburnian warbler, rusty blackbird, little brown bat and Canada warbler.

Rationale:

The spruce-fir forests of Pondicherry have long been recognized for their diverse mix of habitats centered on lowland spruce-fir forests and associated wetlands. Conservation plans including the State of New Hampshire's Wildlife Action Plan and the Nature Conservancy's Lower New England-Northern Piedmont Ecoregional Plan have targeted Pondicherry. In 2003, the Pondicherry Division was designated as the state's first Important Bird Area—an international program which uses scientific criteria to identify habitat important to birds. The CFA supports a complex ecosystem of bogs, ponds, streams and wetlands surrounded by spruce and fir boreal forests supports approximately 238 species of birds, of which 129 species have been confirmed as breeding. We envision healthy spruce-fir forests within the Pondicherry CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of New Hampshire's wildlife.

Our long-term vision for the CFA includes spruce-fir mosaic forests characterized by complex horizontal and vertical structure, a generally closed canopy, larger-diameter trees, dead woody material, snags and cavity trees, native species diversity, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011). Historically, this habitat type was a mosaic of lowland spruce-fir forest and red spruce swamp communities that occur on mineral soils. In the Pondicherry CFA, these communities intergrade in complex ways on the ground, with various expressions ranging from red spruce swamps with either an abrupt transition to a narrow spruce—fir forest border or direct transition to hardwood forest. Lowland spruce—fir forests generally have a well-developed conifer canopy, a sparse tall shrub understory, sparse to moderate cover of ferns and dwarf shrubs, and moderate to high cover of bryophytes.

To date, our review of Pondicherry's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, a coarse-scale habitat inventory, and an understanding of forest disturbance and land-use history within the CFA. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Pondicherry comes from a forest-based habitat inventory conducted in 2007 (USFWS, unpublished), and a reading of the recent forest history within the Pondicherry basin—a legacy of intensive past-use has altered the vegetation structure and composition, landscape patterns, and potentially ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, 2002, Bellemare et al. 2002). In this habitat, heavy disturbance prior to refuge ownership resulted in hardwood-softwood mixtures with a predominance of balsam fir and a paucity of red spruce. Our sub-objective addresses the current spruce-fir forest condition of Pondicherry: remarkably more structurally homogeneous than those of three centuries earlier, with a preponderance of young forest with low species diversity (USFWS, unpublished). Completing a finer-scale comprehensive forest and habitat inventory will aid in identifying stands where a forest management approach combining passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. Much of the spruce-fir forest within the Pondicherry CFA was harvested prior to refuge ownership using techniques that produced a structurally homogenous, young forest landscape. While our management goals may create a relatively old forest, spruce-fir forests within Pondicherry will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like rusty blackbird, are declining as remaining patches of young forest mature (Matsuoka et al. 2010, Powell et al. 2010) (R. Cliche personal communication). Across the CFA, enhanced horizontal structure should support other species of conservation concern like bobcat, spruce grouse, and—if wetlands and riparian areas are present—Canada warbler (Lambert and Faccio 2005, Reitsma et al. 2008, Chace et al. 2009).

The structural homogeneity of spruce-fir forests in Pondicherry has limited important habitat features for refuge priority resources of concern. Pondicherry's spruce-fir forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance. These habitat elements may have importance to declining forest species identified in regional conservation plans like rusty blackbird and Blackburnian warbler. Rusty blackbirds are thought to use younger softwood along riparian areas and open wetlands within spruce-fir forested wetlands in the CFA. Disturbances such as beaver activity and windthrow create forest openings allowing softwood regeneration and potential rusty blackbird habitat (Avery 1995). Blackburnian warbler has significance as a NALCC representative species for hardwood forests in the NALCC northern sub-region. Blackburnian warblers use mature conifer forests of spruce, fir, hemlock, and pines, and mixed wood habitats including deciduous stands with patches of conifer (Morse 1994, Dunn and Garrett 1997, DeGraaf and Yamasaki 2001). Improving vertical diversity of spruce-fir forests during management may provide an important habitat component for Blackburnian warblers, who are canopy foragers who preferentially breed in forests with substantial cover taller than 60 feet (Morse 1976).

Canada warbler, a priority refuge resource of concern, occupies this habitat with high densities occurring in mixed forested swamps (Lambert et al. 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009).

Canada lynx, a federal listed species, will also benefit from our forest management. Canada lynx have been confirmed breeding in northeastern New Hampshire by NH Fish and Game Department, and lynx tracks have been detected near the Pondicherry CFA. Canada lynx require boreal forests that contain a mosaic of early successional and mature forests. Snowshoe hare is their primary food source, and hare density is considered the most important factor in explaining lynx distribution. It is generally believed that at least 0.2 hares per acre are required to support breeding populations of Canada lynx (Ruggiero et al. 1999). A mature forest with abundant coarse woody debris, such as downed trees and root wads are used by lynx for denning habitat. Snow conditions that are deep and fluffy for extended periods of time are thought to favor lynx, providing a competitive edge over bobcats, their principal competitor. Large contiguous tracts of boreal forests with these habitat conditions will facilitate movement between areas of high snowshoe hare abundance within established home ranges.

Monitoring lynx use of habitats in the Pondicherry CFA is a priority, and coordination with New Hampshire Fish and Game Department will allow for a standardized approach. To ensure that Canada lynx persist in the state, it is important that efforts to conserve the species be developed at a landscape scale, since no single landowner is likely to support enough habitat for this species. Collaboration with key partners will be necessary, including adjacent landowners, New England Field Office, the New Hampshire Fish and Game Department and Vermont Fish and Wildlife Department, to develop a lynx conservation plan for northern New Hampshire and neighboring Vermont.

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like black-throated green warblers. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of wildlife species that include: spruce grouse, white-throated sparrow, American marten, denning Canada lynx, and white-tailed deer.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (20 inches or greater dbh) trees where appropriate. Such larger trees are largely absent or are very few in the younger forests that characterize Pondicherry, and that has implications for wildlife habitats and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the sharp-shinned hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy—provide special habitats that, when near open bodies of water, are utilized by bald eagles. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that use large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Cavity trees may also be used by little brown bats as roosting sites. Female little brown bats raise pups in large maternity colonies within buildings or cavity trees often near wetlands or open water. Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, northern saw-whet owls, and black-backed woodpecker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Continue to manage invasive plant species.

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management.
- Ensure this habitat type provides effective winter shelter for white-tailed deer, consistent with management of refuge resources of concern.
- Evaluate hydrologic regime to inform restoration efforts.
- Work with partners, including the State of New Hampshire, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.
- Work with partners and the USFWS New England Field Office to develop a lynx management plan for northern Vermont and New Hampshire, and evaluate the importance and role of habitats in the Pondicherry CFA to lynx populations in the southern boreal forest.

Within 10 years of CCP approval:

- Implement identified active forest management opportunities by using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Where appropriate, emulate the natural disturbance regime inherent to the forest types within this broad habitat type and work within the confines of seral pathways dictated by soil, climate, and hydrology.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Promote stands dominated by early seral stages where appropriate to support nesting Canada warbler and rusty blackbirds.
- Promote stands dominated by late seral stages in the CFA interior to support blackburnian warbler.
- Retain cavity trees within the vicinity of open water and wetlands to provide maternity sites for little brown bats. Protect current bat maternity roosts, if present.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct forest inventories.
- Continue to survey wildlife use including breeding landbirds and bat inventories
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.
- Monitor Canada lynx populations.

Sub-objective 1.1d. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide breeding and foraging habitat for priority refuge resources of concern including American woodcock, little brown bat and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008).

These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock, little brown bat and American black duck, priority refuge resources of concern.

American woodcock are dependent on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Shrub swamps in the CFA provide moist, rich soils for foraging and the dense shrubs provide cover from predators.

Management of the shrub swamp communities may be required to maintain shrub dominance and stem densities. Tree species, such as red maple, tend to replace mature shrub species and established invasive plants compete for nutrients and space. These invading species require management in order to maintain the native shrub diversity of the community. A high shrub stem density is also important as it provides birds with cover from predators and more leaf surface area for gleaning. Cover for American woodcock, for example, is ideal in a 10-15 year old shrub swamp (USDA 2001). Shrub species, in particular alder, tend to die back as they reach maturity, and as a result stem density decreases. Periodic rejuvenation of shrubs is necessary to maintain required stem densities. Management priority will be given to shrub swamps that are part of a woodcock management area. Management of these shrub swamps will benefit other species that use these communities, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation, and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests near foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14.

Little brown bat, a species being assessed for candidate status under the ESA, feeds over CFA wetland and open water habitat where insect populations are abundant. Bats use echolocation for navigation and to locate prey. Rivers and streams in the CFA are used as travel corridors between suitable habitats. Little brown bats use buildings or tree cavities for summer roost sites, often near open water. Females will roost in large maternity colonies to raise young. Pondicherry CFA is an important feeding area for these bats, which have experienced drastic population declines due to the effects of the fungal disease known as white-nose syndrome.

Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of refuge priority resources, and other species that use CFA wetlands.

Management Strategies:

Within 5 years of CCP approval:

- Create and maintain alder in suitable density and age class to provide quality foraging habitat for American woodcock.
- Manage non-native plant species.
- Map natural communities and protect rare or exemplary examples.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Assess hydrology of wetland communities, evaluate impacts, and prioritize restoration opportunities.
- Monitor American black duck productivity, and use of shrub wetlands.

- Continue to inventory bat populations throughout the CFA to better understand species presence and locate areas with concentrated detections. Investigate areas with high bat activity to determine if maternity roosts are present. Manage and protect maternity roosts if present.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh and Peatlands)

Manage freshwater marsh and peatland communities to support natural and rare ecological communities, and provide breeding and foraging habitat for priority refuge resources of concern including American black duck, and undisturbed staging areas for migrating waterfowl.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams. The substrate in peatland communities is dominated by sphagnum moss, and the vegetation can be semi-treed or dominated by low shrubs, such as sheep laurel and Labrador tea. Sedges and grasses are common in the understory (Gawler 2008).

Freshwater marshes and peatlands are scattered throughout the CFA, but are concentrated along the perimeter of Cherry and Little Cherry ponds. This wetland complex, adjacent to open water habitat, provides important breeding and foraging habitat for American black duck, and other waterfowl species such as ring-necked duck, wood duck, hooded mergansers, and green-winged teal. Cherry Pond is also a key common loon territory in the state, fledging an average of one chick per year per pair. Cherry Pond and Little Cherry Pond are also staging areas for migrating waterfowl, including scaup, bufflehead, gadwall, scoters, and goldeneye. Conservation efforts will focus on maintaining native herbaceous vegetation, and minimizing disturbances during the breeding and migration periods.

Management Strategies:

Within 5 years of CCP approval:

- Minimize refuge activities that disturb wetland communities.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Map natural communities; protect rare or exemplary examples.
- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Continue to survey wildlife use of wetlands.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Manage pasture, hay, and grasslands (where appropriate) as part of a mosaic of habitat conditions required by American woodcock and other shrub-dependent conservation concern species such as chestnut-sided warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

Less than one percent of the Pondicherry CFA is typed as pasture, hay, and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler and field sparrow. American woodcock, a refuge priority resource of concern, will use both habitat conditions when managed in conjunction with their other habitat needs.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). For example, over 12% of the chestnut-sided warbler population breeds in BCR 14 (Dettmers, Randy 2006). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occurs in the northeast (Dettmers and Rosenburg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Shrubland and grassland habitats will also be used by American woodcock, which require diverse structural habitat conditions within close proximity of each other: clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young hardwood forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Small clearings with minimal vegetation is required for courtship areas, and shrublands with clumps of tall vegetation or sparse shrubs will provide roosting habitat.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, and grassland acres can provide quality habitat, for these species, and American woodcock, if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct an inventory of pasture, hay, and grassland habitats to determine their condition, size and location, and incorporate them into the management strategies for American woodcock in the HMP.
- Conduct further investigation on the pasture, hay and grassland habitats that will not be managed for woodcock to determine their importance to other wildlife and contribution to habitat diversity in the landscape.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and uninterrupted aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout. Also provide undisturbed areas for breeding and migrating waterfowl.

Rationale:

Open water habitats in the Pondicherry CFA are limited to Cherry Pond, Little Cherry Pond, Mud Pond, Moorhen Marsh, Cedar Marsh, the John's River and its tributaries, and Stanley Brook. These habitats support several fish species one of which, the Eastern brook trout, has been identified as a conservation priority for the Service's Northeast Region. Brook trout are found in cold headwater rivers and streams. They are sensitive to extreme temperature fluctuations, and require water temperatures between 40 to 70 degrees Fahrenheit for spawning, growth, and survival. Wild brook trout have been documented within the CFA, and many streams, including Carroll Stream, are suitable to be managed as a self-sustaining wild brook trout population. Other species documented from Pondicherry include chain pickerel and several perch species from Cherry Pond, and state species of concern including burbot (cusk), northern redbelly dace, slimy sculpin, and tessellated darter from riverine habitats.

Cherry and Little Cherry ponds, and associated wetlands provide important breeding and foraging habitat for American black duck, and other waterfowl species such as ring-necked duck, wood duck, hooded mergansers, and green-winged teal. Cherry Pond is also one of the State's key common loon territories, fledging an average of one chick per year per pair. Cherry Pond and Little Cherry Pond are also staging areas for migrating waterfowl, including scaup, bufflehead, gadwall, scoters, and goldeneye. Conservation efforts will focus on minimizing disturbances during the breeding and migration periods.

Management of water resources in the Pondicherry CFA will provide unimpeded aquatic species passage to spawning and wintering habitat, structurally diverse in-stream habitat, with boulders and downed woody debris providing riffles and pools, and shade trees along riparian edges. Due to our lack of knowledge regarding aquatic habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. Baseline information on the condition of the water resources in the CFA at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct stream assessments to evaluate the physical, chemical, and biological condition of the Pondicherry Division's fish community structure, productivity, and health.
- Conduct stream assessments to identify man-made physical barriers (e.g., impassable road crossings, culverts, and dams) to the movement of fish and other aquatic organisms.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

In coordination with our Friends group, act as a resource to communities, school systems, public and non-profit organizations, and private educational organizations in northeastern Vermont and northern New Hampshire, who want to use the Pondicherry Division as an outdoor environmental education classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed. Because the Pondicherry Division does not have a facility or full time staff, environmental education efforts will generally be conducted through volunteers, Friends members, and partners.

Management Strategies:

Continue to:

- Make the division available as an outdoor environmental classroom to schools and organizations.

Within 5 years of CCP approval:

- Promote the Pondicherry Division as a destination for field trips and increase the number of students by two percent per year for the next 5 years.
- Encourage and support Friends group to work with local schools to develop experiential learning programs focusing on Northern hardwood and spruce-fir forests, wetlands, and migratory birds that contribute to NH curriculum standards.
- Encourage and support the Friends group to develop an educational partnership with the White Mountain Regional School District, the White Mountain School, and other local schools to use the division as an outdoor classroom emphasizing the ecology of Northern hardwood and spruce-fir forests, wetlands, and migratory birds.
- Make environmental education training conducted in other parts of the refuge available to volunteers and Friends group members.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop an evaluation system to assess the effectiveness of all environmental education programs.

Sub-objective 2.1b. (Environmental Education Delivery)

Promote other government agencies, non-profit organizations, private educational organizations, staff, volunteers, and members of the Friends of Pondicherry to offer high quality environmental education programs at the Pondicherry Division.

Rationale:

See the rationale for sub-objective 2.1a.

Management Strategies:

Within 5 years of CCP approval:

- Use volunteers and members of Friends group to facilitate teachers and students at the Pondicherry Division.
- Work with local environmental education providers to implement the refuge's Adopt-a-Habitat initiative to help schools and individuals learn about and connect with natural features their local environments.
- Work with Friends of Conte Recreation and Education sub-committee to support and recruit partners that seek funding for watershed-based environmental education.
- Work with Friends to develop and provide educational programs on how to detect and report invasive species, such as invasive plants, pathogens, insect pests, fish, and other animals.
- Encourage partners to develop an evaluation system to measure the effectiveness of environmental education programs.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

Encourage and support Friends group to work with communities, public and non-profit organizations, staff, and volunteers to offer quality interpretive programming at the Pondicherry Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail on site, the Pondicherry Division is well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the habitats and cultural resources found on the Pondicherry property.

Management Strategies:

Within 5 years of CCP approval:

- Work with Friends group to employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.
- Collaborate with Friends group and volunteers to create meaningful, consistent, thematic statements to be used in the delivery of programming at the Pondicherry Division.
- Develop more detailed interpretive objectives and strategies as part of a Visitor Services Plan.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of CCP approval:

- Develop self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Make Certified Interpretive Guide (NAI) training available once every other year for refuge personnel, Friends Group members and the general public, with priority given to refuge affiliates.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

Within 5 years of CCP approval:

- Through Friends group, annually provide quality interpretive programs, exhibits, printed media at the Pondicherry Division.
- Initiate a “refuge host” program, or utilize SCA interns and volunteers to provide personal contacts at the refuge to initiate discussion and answer questions, at least between Memorial Day and Labor Day.

- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of CCP approval

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self -guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Pondicherry Division is unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Pondicherry Division is unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation. Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below. The area around Cherry Pond, Little Cherry Pond and the corridor between the two ponds on which the Service holds a management easement will remain closed to hunting complying with the wishes of the landowner and avoiding conflicts in an area popular with hikers, bird watchers, photographers, etc.

Rationale:

Hunting is allowed on national wildlife refuges, as long as it is found to be a compatible use. Pondicherry has been a popular area with hunters, particularly for ruffed grouse, snowshoe hare, and white-tailed deer for many years prior to acquisition by the Service. The division is currently open to hunting except for Cherry and Little Cherry ponds, lands connecting the ponds, and the lands immediately adjacent to the ponds. This area has been closed to hunting since the early 1960s when the original preserve was established by the State of New Hampshire and New Hampshire Audubon. The State has jurisdiction over both large ponds because they are Great Ponds (i.e., water bodies at least 10 acres in size that are held by the State in trust for the people of New Hampshire), and New Hampshire Audubon owns the original preserve land in fee title, although the Service holds an easement on that land. Maintaining the hunting closure of this area retains a long-held tradition that is respected by both hunters and other refuge visitors.

Management Strategies:

Continue to:

- Allow hunting based on regulations which correspond to the State of New Hampshire regulations with the following exceptions:
 - (a) Hunters must wear at least 400 square inches of hunter orange, except when hunting waterfowl or turkey.
 - (b) The season for hunting snowshoe hare and coyotes with dogs is from October 1 to March 15.
 - (c) Use of bait is prohibited.
 - (d) Temporary blinds are permitted, but must have the name and address visible on the stand and the stand must be removed at the end of the hunting season.
- Ensure the area closed to hunting around Cherry and Little Cherry ponds and the corridor between them is evident via signage and delineation on hunt maps and in the hunt brochure.

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain hunting consistent with State hunting regulations and the division-specific regulations mentioned above.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Allow hunters access to the refuge outside of the open hours (i.e., 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.

Within 5 years of CCP approval

- Work with New Hampshire Fish and Game Department to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Work with New Hampshire Fish and Game Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide state-sponsored hunter education classes access to the division. Conduct direct outreach to ensure hunters are informed about refuge-specific regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, web pages, media releases, etc.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

Continue to:

- Work with New Hampshire Fish and Game Department to inform hunters of the field identification differences between ruffed grouse (i.e., partridge) and the protected spruce grouse via flyers at division kiosks, the refuge website, etc.
- The refuge is open to visitors from 30 minutes before sunrise to 30 minutes after sunset with the exception of hunters, snowmobilers, and those issued a Special Use Permit for a specific activity outside of normal open hours. Hunters may be on the refuge prior to and after these hours as long as they are engaged in lawful hunting activities.

Within 1 year of CCP approval:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Pondicherry Division kiosks, through the Friends of Pondicherry, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.
- Work with New Hampshire Fish and Game Department to encourage youth hunting at the division as a means of introducing young people to hunting.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge Web site, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of CCP approval:

- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the hunting program; involve hunters and other users in collecting feedback; determine whether Refuge management objectives are being met; and allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Pondicherry Division. Complete all administrative procedures to officially open refuge lands to fishing, based on New Hampshire Fish and Game Department regulations, and any Division-specific conditions.

Rationale:

Fishing is a priority public use on national wildlife refuges and a popular outdoor recreational activity. The Division has been open to fishing since establishment and we propose to continue to offer this use. Although fishing is not as popular as hunting or wildlife observation at Pondicherry, there still are opportunities for visitors to fish the John's River, Ayling Brook, Cherry and Little Cherry ponds.

Management Strategies:

Continue to:

- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- The Pondicherry Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Maintain the Shoreline Trail along the western shore of Cherry Pond for bank fishing opportunities.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale: Although fishing opportunities are limited at Pondicherry, there are places to fish including Cherry Pond, John's River, and Ayling Brook. Other nearby areas, including the White Mountain National Forest or the Connecticut River, provide higher quality fishing opportunities.

Management Strategies:

Within 1 year of CCP approval:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the Pondicherry Division for people of all physical abilities.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and the most popular recreational activity at Pondicherry. The division is well known for an abundance and variety of wildlife, particularly migratory birds during the nesting season and was recognized as the state's first Important Bird Area where 238 species have been recorded, and 129 of those are confirmed nesters. It also was named a National Natural Landmark by the National Park Service.

Management Strategies:

Continue to:

- Maintain the current visitor infrastructure including the Little Cherry Pond Trail, the Shoreline Trail along the western shore of Cherry Pond, the Colonel Whipple Trail (a segment of the Cohos Trail), the Mud Pond Trail, the Ramparts Trail (connects the Shoreline Trail to the Colonel Whipple Trail), the Slide Brook Trail, kiosks including the parking lot trailhead and kiosk, the kiosk at the Presidential Recreational Trail parking lot on Airport Road, and the observation decks at Cherry Pond, Little Cherry Pond, and Mud Pond.

- Allow wildlife observation and photography at the Pondicherry Division.
- Partner with the New Hampshire Bureau of Trails under the existing Memorandum of Understanding on maintenance of the Presidential Recreational Trail from Airport Road in Whitefield to Route 115A in Jefferson. This is the primary access used by visitors to enter the division.
- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters, anglers, and snowmobilers. The refuge manager may issue a special use permit for public uses during the closed hours.

Within 5 years of CCP approval:

- Construct kiosks at the Colonel Whipple Trail entrance from the East off Whipple Road and at the junction of the Powerline Snowmobile Trail and the Presidential Recreational Trail, south of Waumbek Junction.
- Install wildlife interpretive signs on the Mud Pond and Little Cherry Pond trails.
- Determine whether there is sufficient demand for permanent wildlife viewing blinds strategically located off the trail network.

Within 10 years of CCP approval:

- Construct a native surface, primitive portage trail around the Deadwater section of the John's River, if there is sufficient demand.
- Work with New Hampshire Department of Transportation to explore opportunities to increase parking, construct an observation platform, and install interpretive signs at the State Route 115 pull off that overlooks Cherry Pond.
- Construct a native surface, primitive trail that connects the Mud Pond Trail to the Little Cherry Pond Trail if sufficient demand exists and an environmentally acceptable route can be established. The NEPA compliance and compatibility determination were previously completed for a tentative location (see map A.49).

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people that visit the division. Work closely with the Friends of Pondicherry and other partners who host events designed to view wildlife on the division.

Rationale:

The entire division is available for wildlife observation and photography; however, there are steps the refuge can take to enhance their time on the division. With such a large number of breeding birds, many of which can only be detected by their song, birding can be intimidating. Providing a variety of methods to help people recognize and appreciate Pondicherry wildlife will contribute to this objective.

Management Strategies:

Continue to:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a Special Use Permit.
- Support wildlife observation events led by the Friends of Pondicherry and other partners, including International Migratory Bird Day, Big Sit, etc.

Within 5 years of CCP approval:

- Work with the Friends of Pondicherry to produce a wildlife and plant species guide for Pondicherry that will be available on the refuge website and at division kiosks.
- Work with the Friends of Pondicherry to design a self-guided brochure based on the trail network that helps visitors view and learn about the variety of species inhabiting the division.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Not applicable

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Pondicherry Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking and wildlife observation. One examples include the regional Cohos Trail. Where appropriate, we will work with these partners to promote, and distribute information about, this opportunity.

Management Strategies:

Continue to:

- Work with partners to maintain the Colonel Whipple Trail as a link in the regional Cohos Trail.

Within 5 years of acquiring new lands:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Pondicherry Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate, and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division. Each of these will be managed consistent with the final finding of appropriateness and compatibility determination. Bicycling and horseback riding are allowed on the State-owned Presidential Recreational Trail that intersects the division, however these uses are not being considered for the division because the current and proposed trail network is not designed for these uses.

Management Strategies:

Continue to:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Work with the New Hampshire Bureau of Trails and the local snowmobile club to provide a groomed snowmobile trail in both of the power line corridors that cross the Division.
- Meet at least annually with the local snowmobile club responsible for grooming and maintaining the snowmobile trails to review special use permit stipulations and conditions so long as this use continues to be compatible and consistent with applicable Services laws, policies, and guidelines.

- There are no closed hours for snowmobilers on the designated trails during the snowmobiling season.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.

Within 1 year of CCP approval:

- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- Allow commercial guiding and outfitting for appropriate and compatible uses under a special use permit for guides that charge a fee to customers.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking Pondicherry with other refuge divisions.

Within 10 years of CCP approval:

- Work with the Friends of Pondicherry and New Hampshire Fish and Game Department to determine whether there is sufficient demand for canoe and kayak access to Cherry Pond and the John's River. There is limited demand for this use at present, but if it increases beyond capacity (e.g., impacts pond or stream banks), consider hardening options to eliminate impacts.

Overview Sprague Brook Conservation Focus Area (Proposed)

Richmond, New Hampshire

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	3,016	91.2%
<ul style="list-style-type: none"> ■ Existing Refuge Ownership in CFA¹ ■ Additional Acres in CFA proposed for Refuge Acquisition² 	0	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	290	8.8%
Total Acres in CFA ^{2,4}	3,306	100 %

¹Acres from Service’s Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The Sprague Brook CFA contains a large wetland complex and is a high priority area for many groups, including The Nature Conservancy and local conservation groups. Service land conservation in this CFA would contribute to the larger Quabbin to Cardigan partnership, which is a collaborative, landscape-scale effort to conserve the Monadnock Highlands between two large protected areas: the Quabbin Reservoir in Massachusetts and Mount Cardigan in the White Mountain National Forest in New Hampshire.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 89.5%
- Shrub swamp and Floodplain Forest – 1.4%
- Freshwater Marsh – 2.2%

For more information on habitats in the CFA, see map A.54 and table A.39.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.40 below, there are seven Priority Refuge Resources of Concern (PRRC) terrestrial and aquatic species that rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) including wetland dependent species and forest interior dwelling bird species. These species and others are discussed further below.

1. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA), and habitats along the main stem, receives higher use by migrating landbirds. As birds move north, they disperse beyond the Connecticut River main stem, becoming more evenly distributed in habitats across the watershed (Smith College 2006). The Sprague Brook CFA not only provides important stopover habitat for migrating landbirds, but breeding habitat for landbirds and waterbirds as well.

The New Hampshire Chapter of The Nature Conservancy (TNC) identified Sprague Brook as one of 13 high priority habitat areas in the Ashuelot River Watershed. These areas were identified due to their ecological diversity and unfragmented landscape (Zankel 2004). Due to this designated priority, TNC initiated the collection of baseline bird and habitat data within the Sprague Brook area. A total of 63 species were recorded including high priority conservation concern forest interior species and wetland dependent species.

Conservation of concern forest interior species observed in the Sprague Brook area include red-shouldered hawk, wood thrush, blackburnian warbler, black-throated blue warbler, ovenbird, and veery (Roth et al. 1996, Rosenberg et al. 2003) (Littleton et al. 2005). Wood thrush and blackburnian warbler are PRRC species that rely on the mature forests in the CFA. American woodcock, another PRRC species, was also recorded.

The large wetland complex within the Sprague Brook CFA may provide suitable habitat for multiple pairs of herons, rails, and bitterns during the breeding season. Detected species include State Species of Greatest Conservation Need such as American bittern, great blue heron, and Virginia rail (Littleton et al. 2005).

Other high priority species of conservation concern that may occur in the Sprague Brook CFA include Canada warbler, a PRRC species, cerulean warbler, Cooper's hawk, Northern goshawk, least bittern, Louisiana waterthrush, and whip-poor-will (Littleton et al. 2005).

2. Waterfowl

Mallards, Canada geese, and wood ducks were detected using the large wetland complex in the Sprague Brook CFA. American black duck, a PRRC species, was not observed during a 2005 breeding bird survey, however, there is a high probability that this species may be present (Littleton et al. 2005).

3. Diadromous fish

The streams and brooks within the Sprague Brook CFA provide high quality, intact aquatic habitat. Roaring Brook, and its Sprague Brook tributary, are free-flowing, with no dams, from their headwaters to the confluence with the Ashuelot River. These pristine brooks provide cold water habitat for PRRC species including Atlantic salmon and native Eastern brook trout. The intact forested landscape within the Sprague Brook CFA provides forested buffers along the streams and wetlands that help to maintain cool water temperatures.

4. Wetlands

The large wetland complexes in the Sprague Brook CFA are influenced by Sprague Brook and its tributaries. The majority of these wetland systems can be characterized as a fen (Littleton et al. 2005), and contain a mosaic of conifer swamp, shrub-swamp, and floodplain forest, and freshwater marsh. The 150-acre wetland complex along the main stem, and 50-acre complex located along a tributary provides important habitat for a diversity of wetland dependent species.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested, and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and native species will dominate. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, and ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse in-stream habitat, and clear aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We will focus on providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

Were there other special considerations in delineating the CFA boundary?

Sprague Brook has been identified as a Quabbin to Cardigan Collaborative Conservation Focus Area. These focus areas have high ecological diversity and provide habitat connectivity between the Quabbin Reservoir in Massachusetts and Cardigan Mountain in New Hampshire. They were developed through a multi-agency and organizational partnership involving over 20 agencies and organizations from Massachusetts and New Hampshire.

Sprague Brook was also identified by The New Hampshire Chapter of The Nature Conservancy (TNC) as one of 13 high priority habitat areas in the Ashuelot Watershed due to its ecological diversity and unfragmented landscape.

The native brook trout fishery, within the Sprague Brook CFA, has been designated as a Wild Trout Water, an area managed by New Hampshire Fish and Game Department to provide wild trout fishing experience.

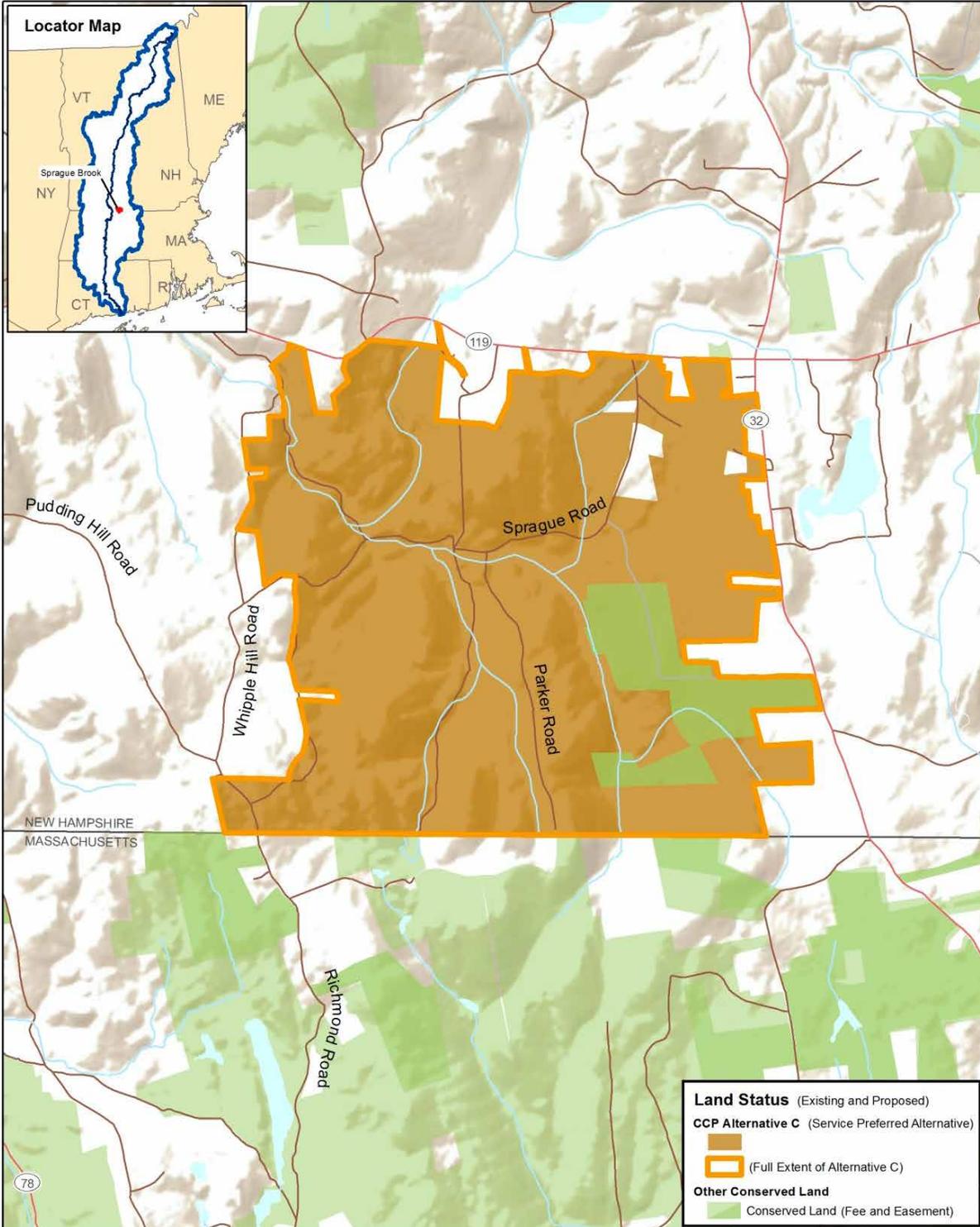
Map A.53. Sprague Brook CFA – Location.



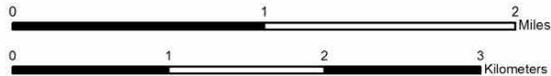
U.S. Fish & Wildlife Service

Sprague Brook CFA under CCP Alternative C

Silvio O. Conte National Fish and Wildlife Refuge



This map is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. The conserved lands layer (2012) was obtained from Trust for Public Land. Other 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: 3/18/2015



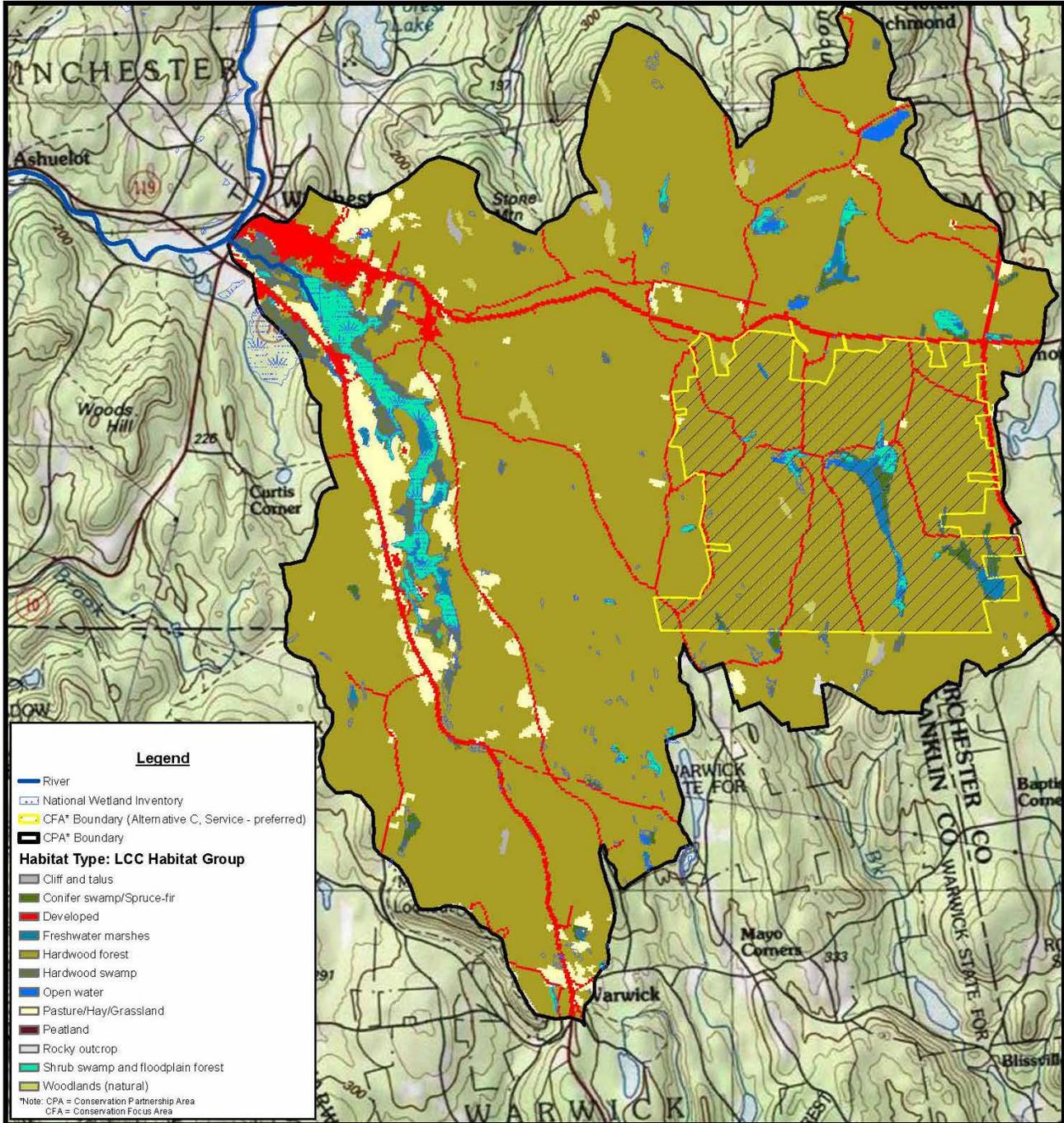
Map A.54. Sprague Brook CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Sprague Brook CPA* - NH

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management. It is not intended for use as a land survey or as a representation of land for conveyance or tax purposes. For more information visit the USFWS Northeast Region GIS website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013



Table A.39. Sprague Brook CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands⁹							
Conifer swamp/spruce-fir	152	0.8%	63	33	0	1.9%	41.4%
Hardwood forest	16,094	83.9%	2,991	226	0	89.5%	18.6%
Hardwood swamp	354	1.8%	2	0	0	0.0%	0.4%
Shrub swamp and floodplain forest	433	2.3%	45	5	0	1.4%	10.5%
Woodlands (natural)	94	0.5%	11	0	0	0.3%	11.4%
<i>Forested uplands and wetlands subtotal</i>	<i>17,128</i>	<i>89.3%</i>	<i>3,112</i>	<i>264</i>	<i>0</i>	<i>93.1%</i>	<i>18.2%</i>
Non-forested Uplands and Wetlands⁹							
Cliff and talus	38	0.2%	0	0	0	0.0%	0.0%
Freshwater marshes	143	0.7%	74	6	0	2.2%	51.3%
Pasture/hay/grassland	735	3.8%	5	0	0	0.1%	0.7%
Rocky outcrop	17	0.1%	0	0	0	0.0%	0.0%
<i>Non-forested uplands and wetlands subtotal</i>	<i>934</i>	<i>4.9%</i>	<i>78</i>	<i>6</i>	<i>0</i>	<i>2.3%</i>	<i>8.4%</i>

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Inland aquatic habitats⁹							
Open Water	49	0.3%	7	0	0	0.2%	14.5%
<i>Inland aquatic habitats subtotal</i>	49	0.3%	7	0	0	0.2%	14.5%
Other							
Developed	1,070	5.6%	145	16	0	4.3%	13.5%
<i>Other subtotal</i>	1,070	5.6%	145	16	0	4.3%	13.5%
TOTAL	19,181	100.0%	3,342	286	0	100.0%	17.4%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

- 2 - Conservation Partnership Area
- 3 - Conservation Focus Area; representing Service - preferred Alternative C
- 4 - Percentage of the CPA represented by the habitat type
- 5 - Acres in the CFA currently conserved by others (TNC 2012)
- 6 - Acres in the CFA currently owned by the USFWS
- 7 - Percentage of the CFA represented by the habitat type
- 8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C
- 9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.40. Sprague Brook CFA – Preliminary Priority Refuge Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 2,991 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	Red-shouldered Hawk ^{I, J} Jefferson Salamander ^{I, J} Veery ^A Bobcat ^I Ovenbird^A
Blackburnian Warbler ^A	Breeding habitat includes mature conifer, and conifer-deciduous forests (80+ years old) (Degraaf et al. 2001, Dunn et al. 1997, Morse 2004).	Black-throated Blue Warbler ^A Black-throated Green Warbler ^A Eastern Wood Pewee ^{A, J} Northern Flicker ^{A, J} Yellow-bellied Sapsucker ^{A, J} Rose-breasted Grosbeak ^A
American Woodcock ^{A, B, C}	Breeding and roosting habitat includes young deciduous and mixed forests (1-20 years old) dominated by aspen and birch, and 3+ acre forest openings with 60% shrub cover, in proximity to alder wetlands and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).	Chestnut-sided Warbler^{A, I} Eastern Red Bat^I Louisiana Waterthrush American Redstart ^{A, J} Baltimore Oriole ^J Black-and-white Warbler ^J Black-billed Cuckoo ^{A, J}
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Broad-winged hawk ^{I, J} Whip-poor-will ^{A, I, J} Great-crested Flycatcher ^J Northern Goshawk ^{A, I, J} Purple Finch ^{A, I} Ruffed Grouse ^A Black Racer ^I
Conifer Swamp⁵ - 63 acres		
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Red-shouldered Hawk ^I Rose-breasted Grosbeak ^A Purple Finch ^{A, I} Veery ^A Wood Duck ^A Northern Parula ^A

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Hardwood Swamp⁵ - 2 acres		
<p>North-Central Appalachian acidic swamp^H</p> <p>North Central Interior and Appalachian rich swamp^H</p>	<p><i>North-Central Appalachian acidic swamps</i> are found in basins or on gently sloping seepage lowlands. Eastern hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer. <i>North Central Interior and Appalachian rich swamps</i> are found in basins where higher pH and/or nutrient levels are associated with a rich flora. Species include red maple, black ash, as well as calcium loving herbs. Conifers include American larch, but typically not northern white cedar, which is characteristic of more northern wetland systems. There may be shrubby or herbaceous openings within the primarily wooded cover. The substrate is primarily mineral soil, but there may be some peat development (Gawler 2008).</p>	<p>Uncommon plant community within the landscape that contributes to BIDEH*</p>
Shrub Swamp and Floodplain Forest⁵ - 45 acres		
<p>American Black Duck^{A, B, C, G}</p>	<p>Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).</p>	<p>Warbling Vireo Willow Flycatcher Black Racer^I Ruffed Grouse^A</p>
<p>American Woodcock^{A, B, C}</p>	<p>Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands, and herbaceous openings (Kelley et al. 2008, Sepik et al. 1994).</p>	<p>Eastern Ribbon Snake^I Great Blue Heron^I Veery^A American Redstart^{A, J} Wood Duck^J Eastern Kingbird^J Gray Catbird^J</p>
Woodlands (natural)⁵ - 11 acres		
<p>Central Appalachian pine-oak rocky woodland^H</p>	<p>This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer, others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008).</p>	<p>uncommon plant community within the landscape that contributes to BIDEH*</p>

Overview Sprague Brook Conservation Focus Area (Proposed)

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 74 acres		
American Black Duck^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	American Bittern^{A, L, J} Marsh Wren Virginia Rail^I Great Blue Heron ^I Wood Duck ^{A, J} Northern Harrier ^{A, J} Northern Leopard Frog ^I Eastern Ribbon Snake ^I Canada Goose ^A
Pasture/Hay/Grassland⁵ - 5 acres		
American Woodcock ^{A, B, C}	Roosting habitat includes old fields with scattered tall herbaceous vegetation and/or shrubs. Herbaceous openings such as log landings and pasture used for singing grounds (Kelley et al. 2008, Sepik et al. 1994).	Field Sparrow ^J Northern Harrier ^{A, L, J}

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Open Water⁵ – 7 acres		
Brook Trout^{B, F}	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	Northern Redbelly Dace ¹ Slimy Sculpin¹ Burbot ¹
Atlantic Salmon^{B, E, G}	Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005).	

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

- A: 2008 Bird Conservation Region 14.
- B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.
- C: 2008 USFWS Birds of Conservation Concern.
- D: Federal Threatened and Endangered status as of 2010, including Candidate Species
- E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010
- F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan
- G: Silvio O Conte Refuge Purpose Species.
- H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

- A: 2008 Bird Conservation Region 14.
- I: 2006 New Hampshire Wildlife Action Plan (Species of Greatest Concern)
- J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Sprague Brook CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, American woodcock, Canada warbler, and Blackburnian warbler.

Rationale:

We envision healthy forests within the Sprague Brook CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of New Hampshire's wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011). This large, contiguous block of matrix forest has been identified by a host of partners including the State of New Hampshire's Wildlife Action Plan, the Nature Conservancy's Lower New England-Northern Piedmont Ecoregional Plan, and the Quabbin-to-Cardigan Collaborative Conservation Plan.

Sprague Brook CFA's hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is most certainly available within the CFA. To date our review of Sprague Brook's habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Sprague Brook comes exclusively from a reading of forest history in New England—a legacy of intensive past-use has altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of Sprague Brook are remarkably more homogeneous than those of three centuries earlier, and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach combining passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For forest birds, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Sprague Brook will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature (Sepik et al. 1994, Kelley et al.

2008). Across the CFA, enhanced horizontal structure should support other species of conservation concern like chestnut-sided warbler, ruffed grouse, and—if wetlands and riparian areas are present—Canada warbler (Lambert and Faccio 2005, Reitsma et al. 2008, Chace et al. 2009).

Sprague Brook's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape: canopy, midstory, understory, and ground layer. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and Blackburnian warbler. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for Blackburnian warblers, who are thought to be strongly associated with the hemlock forests within Sprague Brook—and have been shown to decline in response to removal of hemlock by hemlock woolly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Close canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and—when along rocky bottomed streams—Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the yellow-bellied sapsucker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Identify forest stands where soils and species composition will support woodcock management.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.
- Work with regional partners to survey forests for non-native invasive insects.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Conifer Swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Sprague Brook CFA, softwood swamps frequently have undergone significant alteration and have potential for restoration. This habitat type is often found in small patches on mineral soils that are nutrient poor; there may be an organic layer, but generally deep peat soils are absent. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. The dynamic nature of the watertable drives complexes of forest upland and wetland species including red maple, balsam fir, red spruce, and ash species. Where soils tend more to alkaline conditions white cedar is a common tree species, and the shrub layer is generally more diverse. Within the Connecticut River watershed, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats.

Successional trends in softwood swamps are not well understood. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within Sprague Brook will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aide in the restoration of historical species mixtures.

Where needed, restoration of softwood swamp habitats will create high-quality habitat for neotropical migratory birds. Closed canopy softwood forests that include white cedar and other softwoods provide important mast, food, nesting, and cover. Softwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert and Faccio 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Conifer swamps in the Sprague Brook CFA are within a matrix of contiguous

forest, where fragmentation is not a concern. Conifer swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the Sprague Brook CFA, and allow monitoring of population response to management actions (R. Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of New Hampshire, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1c. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide breeding and foraging habitat for priority refuge resources of concern including American woodcock and American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. The landscape mosaic of flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including American woodcock and American black duck, priority refuge resources of concern.

The wetland complex along Sprague Brook is relatively large, containing a mosaic of shrub swamp, conifer swamp, and freshwater marsh. Suitable habitat may exist for multiple pairs of herons, rails, and bitterns during the breeding season. There is also a high probability that this wetland complex will provide habitat for several state species of greatest conservation need including common moorhen, least bittern, and sora rail.

American woodcock are dependent on early-successional forests—a habitat in decline in portions of the watershed. Species dependent upon disturbances that create early successional forested habitats, like American woodcock, are declining as remaining patches of young forest mature. Woodcock require varying habitat conditions that are within close proximity of each other, including clearings for courtship, forest openings with sparse shrub or herbaceous cover for roosting, young deciduous forests of shade intolerant tree species for nesting and brood rearing, and functional foraging areas (Sepik et al. 1994, Kelley et al. 2008). Shrub swamps in the CFA provide moist, rich soils for foraging and the dense shrubs provide cover from predators.

Management of the shrub swamp communities may be required to maintain shrub dominance. Most shrub swamps maintain themselves, but tree species, such as red maple, can become established, and dominate the wetland community. Invasive plants, such as common reed, are a threat to these communities, and mechanical and chemical treatment of this invasive reed is necessary. Management of these shrub swamps will not only benefit American woodcock, but other shrub swamp specialists, including willow flycatcher, American redstart, chestnut-sided warbler, ruffed grouse, black racer, and eastern ribbon snake.

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation, and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests near foraging habitat in nearby uplands or dry hummocks in the wetland (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 14. Protecting and managing these shrub wetland communities from potential threats, including invasive species introduction, altered hydrology, and fragmentation, will contribute to the conservation of this species.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1d. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without

jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complimented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Sprague Brook CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.

- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily, and narrow-leaved cattail. This habitat is associated with lakes, ponds, impoundments, and slow-moving rivers and streams (Gawler 2008). These marshes are also maintained over time by beaver activity, an important natural disturbance process within the Sprague Brook watershed.

Our coarse-scale habitat analysis of this CFA identifies these wetlands as scattered throughout the CFA, with a large percent occurring along Sprague Brook. This wetland complex is relatively large, containing a mosaic of shrub swamp, conifer swamp, and freshwater marsh. Suitable habitat exists for multiple pairs of herons, rails, and bitterns during the breeding season. There is also a high probability that several state species of greatest conservation need may be present including common moorhen, least bittern, sora rail, and American black duck.

American black duck is a refuge priority resource of concern, and use freshwater marsh and shrub-swamp habitats for breeding and foraging. Well-concealed nests are placed on the ground in uplands near beaver impoundments, floodplains, alder-lined brooks and other wetlands. Brood rearing habitat includes emergent marsh or flooded wetlands with abundant emergent vegetation, sedges, submerged aquatic plants and scrub-shrub vegetation rich in invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for American black duck.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of freshwater marshes at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Encourage local landowners to use New Hampshire Best Management Practices within active agricultural fields that are located along the perimeter of marsh habitats.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Survey wildlife use of existing wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Manage pasture, hay and grasslands (where appropriate) as part of a mosaic of habitat conditions required by American woodcock; areas not managed for woodcock will be allowed to revert to natural conditions.

Rationale:

Less than one percent of the Sprague Brook CFA is typed as pasture, hay, and grassland habitat. The management focus for the Sprague Brook CFA is to provide habitat for forest dependent species including wood

thrush, blackburnian warbler, Canada warbler, and American woodcock (see Sub-objective 1.1a). American woodcock require varying habitat conditions, including open habitats such as pastures, hayfields, and grasslands. Habitats with minimal herbaceous cover in the spring are used for courtship displays, while open areas with sparse shrub or clumped herbaceous vegetation are used for roosting. Fields with moist soil conditions will also be used for foraging (McAuley et al. 1996).

Pasture, hay, and grasslands will be managed in conjunction with the other habitat conditions that woodcock require. Due to these specific habitat requirements, and our unfamiliarity with the overall habitat conditions in the CFA, a comprehensive, multi-scale forest and wildlife habitat inventory will be necessary to implement refuge strategies. This inventory will need to encompass all habitats within the CFA and associated landscape. Baseline information on the condition of pasture, hay, and grassland habitats at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down Habitat Management Plan.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct an inventory of pasture, hay, and grassland habitats to determine their condition, size and location, and incorporate them into the management strategies for American woodcock in the HMP.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and Atlantic salmon.

Rationale:

The streams and brooks within the Sprague Brook CFA provide high quality, intact aquatic habitat. Roaring Brook and its Sprague Brook tributary are free-flowing, with no dams, from their headwaters to the confluence with the Ashuelot River. These pristine brooks provide cold water habitat for Atlantic salmon and wild Eastern brook trout. Brook trout and Atlantic salmon are sensitive to extreme temperature fluctuations, and require water temperatures between 40-70 degrees Fahrenheit for spawning, growth, and survival. The intact forested landscape within the Sprague Brook CFA provides forested buffers along the streams and wetlands that help to maintain these cool temperatures. The native brook trout fishery, within the Sprague Brook CFA, has been designated as a Wild Trout Water, an area managed by New Hampshire Fish and Game Department to provide wild trout fishing experience.

Management of water resources in the Sprague Brook CFA will focus on providing rivers and streams with clear aquatic species passage to spawning and wintering habitat, and in-stream habitat that is cold and structurally diverse. The protection and restoration of these aquatic resources will further conservation in the Ashuelot River Watershed.

Due to our lack of knowledge regarding habitat conditions in the CFA, implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife and habitat inventory. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Implement a remediation plan for identified obstacles to aquatic species passage.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate the physical, chemical, and biological condition of the fish community structure, productivity, and health.
- Work with partners to conduct stream assessments to identify manmade physical barriers (e.g. impassable road crossings, culverts and dams) to the movement of fish and other aquatic organisms.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Sprague Brook Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Sprague Brook Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Sprague Brook Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Sprague Brook Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Sprague Brook Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the Sprague Brook Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Sprague Brook Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Sprague Brook Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Sprague Brook Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.

- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Sprague Brook Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Sprague Brook Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience following state regulations, except as noted under Strategies below.

Rationale:

The Sprague Brook CFA is a popular area to hunt white-tailed deer, moose, Eastern wild turkey, black bear, and small game. Hunting, consistent with the final compatibility determination, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations
 - (a) The season for hunting snowshoe hare and coyotes with dogs is from October 1 to March 15.
 - (b) Use of bait is prohibited.
 - (c) Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Sprague Brook Division kiosks, through a friends group, and in local businesses.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with New Hampshire Fish and Game Department to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of acquiring sufficient land to support hunting seasons:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the Sprague Brook Division after completing all administrative procedures to officially open refuge lands to fishing, based on New Hampshire Fish and Game Department regulations, and division-specific conditions, if necessary.

Rationale:

There are several streams in the proposed CFA including Roaring Brook and Mirey Brook. Both streams support Eastern brook trout. A variety of other game fish are found in streams and ponds within the CFA including rainbow trout and largemouth bass. Fishing is a popular activity throughout this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The Sprague Brook Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land with fishable waters:

- Produce a brochure that highlights fishing opportunities for distribution at a division kiosk and the refuge website.
- Work with the New Hampshire Fish to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of acquiring land with fishable waters:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available at the refuge website, refuge offices, division kiosks, through friends groups, and in local businesses.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the division.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. Local organizations such as the Monadnock Chapter of New Hampshire Audubon and others offer organized field trips to popular natural areas. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exceptions listed for hunters and anglers. The refuge manager may issue a special use permit for public uses during the closed hours.
- Install an informational kiosk to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring land:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups such as the Monadnock Chapter of New Hampshire Audubon and other environmental organizations to include wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Not applicable

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Sprague Brook Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource. Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Sprague Brook Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge properties.