

Appendix B



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Blackburnian warbler

Process for Establishing Priority Refuge Resources of Concern

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Introduction

This appendix describes the process we followed to establish priority resources of concern for Silvio O. Conte National Fish and Wildlife Refuge (Conte Refuge, the refuge). Priority refuge resources of concern are determined using a multitude of mandates, policies, purposes, and regional and national conservation plans. They also guide the development of refuge biological goals and objectives. These goals and objectives serve as the foundation for developing refuge Comprehensive Conservation Plans (CCPs), as well as, step-down plans such as Habitat Management Plans (HMPs) and Inventory and Monitoring Plans (IMPs).

Priority refuge resources of concern include flora and fauna that are of high conservation concern. The process results in selecting species which will benefit from refuge management and will also be the most effective ecological contribution within the Connecticut River watershed ecosystem and the National Wildlife Refuge System (Refuge System). The resources of concern and their associated habitats were identified during the CCP process following the guidelines and process discussed here.

Process for Establishing Priority Refuge Resources of Concern

The CCP Planning Team used the procedure outlined in the U.S. Fish and Wildlife Service's (Service) guidance "Identifying Refuge Resources of Concern and Management Priorities: A Handbook" (Pavelgio and Taylor 2010) to establish priority refuge resources of concern. According to the Service policy on habitat management plans (620 FW 1), resources of concern include, "all plan and/or animal species, species groups, or communities specifically identified in refuge purpose(s), [Refuge] System mission, or international, national, regional, state, or ecosystem conservation plans or acts."

This team referred to Service mandates, compiled resource information, and consulted experts to create a comprehensive list of species and habitats that could be of management concern for the refuge. This list addressed a broad range and high number of conservation needs, and therefore, was reduced to include those species that were the highest priority for conservation, and whose core range was within the Connecticut River watershed. This list of priority resources of concern will be used to guide conservation and management efforts within the Connecticut River watershed. For each refuge unit and proposed Conservation Focus Area (CFA), we selected a subset of these resources to focus our management on (all existing refuge divisions are covered by a proposed CFA). Our discussion below corresponds to the steps listed in the handbook.

1.0) Collect information and data

1.1) Mandates for management on refuges

Primary legal mandates and Service policies direct priorities for wildlife and habitat management on refuges, and guide the process for selecting resources of concern. Management mandates include policy and law that: (1) identify refuge purposes, (2) that govern management of refuges and Refuge System resources of concern, and (3) that directs management to achieve biological integrity, diversity, and environmental health on each refuge.

Refuge Purposes

Conte Refuge was established under the Silvio O. Conte National Fish and Wildlife Refuge Act, which lists the following refuge purposes:

- (1) To conserve, protect, and enhance the Connecticut River populations of Atlantic salmon, American shad, river herring, shortnose sturgeon, bald eagles, peregrine falcons, osprey, black ducks, and other native species of plants fish and wildlife.
- (2) To conserve, protect, and enhance the natural diversity and abundance of plant, fish, and wildlife species and the ecosystem upon which these species depend within the refuge.
- (3) To protect species listed as endangered or threatened, or identified as candidates for listing, pursuant to the Endangered Species Act (ESA) of 1973 as amended (16 U.S. 1531 *et seq.*).
- (4) To restore and maintain the chemical, physical, and biological integrity of wetland and other waters within the refuge.
- (5) To fulfill the international treaty obligations of the United States relating to fish and wildlife and wetlands.
- (6) To provide opportunities for scientific research, environmental education, and fish and wildlife oriented recreation and access to the extent compatible with the other purposes stated in this section.

Table B.1. Summary of the Establishment of Conte Refuge

State	Division/Unit	Year Division or Unit Established	Resource Values Identified at Acquisition
VT	Nulhegan Basin Division	1999	Extensive contiguous forest for breeding migrant landbirds and wetland habitat for nesting waterfowl. A viable population of spruce grouse and at least 13 rare plant and animal species occur on site. Important deer wintering area.
	Putney Mountain Unit	1999	Northeastern bulrush, a federally listed species, occurs within this unit.
MA	Third Island Unit	1997	Riparian habitat provides spawning areas for American shad, blueback herring, and shortnose sturgeon. Bald eagle nest site, largest fresh water mussel population, and 30 rare plant and animal species occur.
	Honeypot Road Wetlands Unit	1999	A complex of vernal pools and scrub/shrub wetlands and hosts three rare vertebrates and two rare invertebrate species.
	Wissatinnewag Unit	2001	Steep, hardwood forest on south facing slope that provides important migratory bird stopover habitat in the spring and nesting passerine birds.
	Mount Tom Unit	2002	A large block of contiguous forest that hosts a diversity and abundance of migrant land birds and raptors. Bald eagles nest in this area, and over 30 rare plant and animal species occur.
	Mount Toby Unit	2003	Extensive contiguous forest and small wetlands provide breeding habitat for migrant landbirds. About 20 rare plant and animal species occur here.
	Fort River Division	2005	Riparian forest and a large block of contiguous grassland habitat for upland sandpipers, grasshopper sparrows, savannah sparrows, and bobolinks. Dwarf wedgemussel, a federally listed species, occurs in the Fort River.
	Mill River Division	2007	Floodplain forest that is key stopover habitat for migratory landbirds and waterfowl during spring and fall.
	Dead Branch Division	2011	This area includes riverine and riparian habitat for spawning blueback herring, American shad, sea-run Atlantic salmon (naturally reproducing population).
	Westfield River Division	2013	Over 1,000 feet of key riparian habitat, mixed hardwoods that benefit breeding migratory birds, vernal pools. Part of an unusually large expanse of minimally fragmented forest.
	Hatfield Unit	2014	Floodplain herbaceous wetland complex that is key stopover habitat for migratory landbirds and waterfowl during spring and fall. This wetland complex is listed as Core Habitat and a Priority Wetland and Aquatic Core by the Massachusetts Natural Heritage and Endangered Species Program.
	Fannie Stebbins	2015	This unit includes swamps, ponds, herbaceous wetlands, grassy meadows, hardwood forest, sandbars, and an island. It encompasses one of the largest remaining patches of floodplain habitat along this heavily human-impacted section of the Connecticut River. The wetlands provide breeding habitat for marsh birds and stop-over habitat for migratory waterfowl. During summer and fall the shoreline offers shallows and sandbars for resting and feeding gulls, raptors, shorebirds, and herons. The woodlands and brushy areas provide important habitat for many species of breeding, migratory, and wintering land birds.

State	Division/Unit	Year Division or Unit Established	Resource Values Identified at Acquisition
NH	Pondicherry Division	2000	This area includes a wetland complex that provides habitat for great blue heron (rookery), and stop-over habitat for waterfowl including wood ducks, ring-necked ducks, and black ducks.
	Blueberry Swamp Division	2007	Extensive area of pasture, hayfields, and old fields reverting to shrubs and forest. Also includes small fens and swamps. Breeding habitat for marsh hawks (northern harriers) and grassland birds, and hosts 10 rare plants.
	Saddle Island	2015	Unique physical environment, habitats, and vegetation. The alluvial deposition of cobbles, sand and silt during high spring flood events created the island, and annual flooding across the island have created a gradient of substrate types and therefore unique habitats and vegetation. Supports a federal listed plant species.
CT	Deadman's Swamp Unit	2005	This area includes alluvial floodplain forest and freshwater marsh. Floodplain forest provides breeding habitat for migrant landbirds, and the marsh is used by wading birds and waterfowl. Sora rail, black rail, and yellow-breasted chat have been recorded, and the federally threatened Puritan tiger beetle occurs on this site. Last species discovered after the refuge's 1995 Final Environmental Impact Statement (FEIS).
	Roger Tory Petersen Unit	2012	This area includes a tidally influenced riverine habitat important for spawning blueback herring, alewives, and sea-run Atlantic salmon (naturally reproducing population).
	Salmon River Division	2009	This area includes a tidally influenced riverine habitat important for spawning blueback herring, alewives and sea-run Atlantic salmon (naturally reproducing population).

*Special Focus Areas may cover a larger area than the current refuge units/division acreages

Table B.2. Summary of Species and Habitats Identified in Silvio O. Conte National Fish and Wildlife Refuge Act Establishment Purposes

Species, Species Group, or Habitat	Life History Requirements and Supporting Habitat Type(s)
Atlantic salmon	<i>Migration and Spawning:</i> Connecticut River and tributaries.
American shad	<i>Migration and Spawning:</i> Connecticut River and tributaries.
River herring	<i>Migration and Spawning:</i> Fast moving, shallow water in the Connecticut River and tributaries.
Shortnose sturgeon	<i>Migration and Spawning:</i> Connecticut River main stem.
Bald eagle	<i>Nesting:</i> Mature forests adjacent to open water habitats. <i>Foraging:</i> Open water, including Connecticut River main stem. <i>Wintering:</i> Lower Connecticut River main stem and estuary.
Peregrine falcon	<i>Nesting:</i> Cliff and talus systems. <i>Foraging:</i> Open water habitats and associated herbaceous wetlands.
Osprey	<i>Nesting:</i> Mature Forests or elevated platforms adjacent to open water. <i>Foraging:</i> Open water including Connecticut River main stem.
American black duck	<i>Breeding and Migrating:</i> Herbaceous and forested wetlands, shallow lakes with emergent vegetation, bogs in boreal forests. <i>Wintering:</i> Open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging, as well as tidal wetlands.

Species, Species Group, or Habitat	Life History Requirements and Supporting Habitat Type(s)
<p>Federally listed and candidate species</p>	<p><u>Current federally listed and candidate species within watershed:</u></p> <p>Dwarf wedgemussel–<i>Year-round</i>: Connecticut River and tributaries.</p> <p>Puritan tiger beetle–<i>Year-round</i>: Sandy beaches of the Connecticut River and tributaries.</p> <p>Jesup’s milkvetch–<i>Year-round</i>: Riverside outcrops and ledges of the Connecticut River.</p> <p>Northeastern bulrush–<i>Year-round</i>: Herbaceous wetlands.</p> <p>Small-whorled pogonia–<i>Year-round</i>: Hardwood forests.</p> <p>Canada lynx–<i>Year round</i>: Spruce-fir forests.</p> <p>Northern bog turtle–<i>Year round</i>: Open wetlands</p> <p>Rufa red knot–<i>Breeding</i>: Sandy beaches at the mouth of Connecticut River.</p> <p>Northern long-eared bat–<i>Breeding and Roosting</i>: Mature forests. <i>Wintering</i>: Caves.</p> <p>Indiana bat–<i>Breeding and Roosting</i>: Mature forests. <i>Wintering</i>: Caves.</p> <p>Piping plover–<i>Breeding</i>: Sandy beaches at the mouth of the Connecticut River.</p> <p>Atlantic sturgeon–<i>Migration and Spawning</i>: Connecticut River main stem.</p> <p>Shortnose sturgeon–<i>Migration, Spawning and Overwintering</i>: Connecticut River main stem.</p> <p>Roseate tern–<i>Migration</i>: Sandy beaches at mouth of Connecticut River</p>
<p>Wetlands</p>	<p><u>Wetland Habitat Types within the Refuge:</u></p> <p>Freshwater Marshes–Dominated by herbaceous vegetation including jewel weed, common bulrush, narrow-leaved cattail, marsh fern, water lily, wild rice and sedges.</p> <p>Peatlands–Includes acidic and alkaline fens and acidic peatlands. These wetlands are dominated by sphagnum moss, as well as leather leaf, bog rosemary, sheep laurel, pitcher plant, cotton grass, and often scattered with stunted black spruce.</p> <p>Conifer Swamps–Includes swamps dominated by conifer trees such as northern white cedar, red spruce, balsam fir, eastern hemlock, and American larch. The herbaceous and shrub layer tends to be species poor, but depends on the soils, and may include red-osier dogwood, catberry, ferns, and ephemerals.</p> <p>Hardwood Swamps–Includes swamps dominated by deciduous trees such as red-maple, black ash, swamp white oak, and pin oak. Shrubs and herbaceous layer may include buttonbush, holly, ferns, and sedges.</p> <p>Shrub Swamps and Floodplain Forests–Shrub swamps are dominated by shrubs including alder, willow, meadowsweet, dogwood, sedges, and rushes. Floodplain forests are often dominated by silver maple mixed with red maple, ash, and oaks. Shrubs include black willow, viburnums, and silky dogwood. The herb layer includes ferns and spring ephemerals.</p> <p>Salt Marsh–Includes intertidal marshes where salinity levels are between 5 and 50 parts per thousand). Salt tolerant species occur such as cordgrass, glasswort, switchgrass, sedges, rushes, and eastern red cedar in the higher portions of the marsh.</p>

National Wildlife Refuge System Policy

The Refuge System Improvement Act requires that each refuge be managed to fulfill both its establishment purpose(s) and the mission of the Refuge System. Where there is conflict, individual refuge purposes have priority.

Section 4(a)(3) of the Refuge System Improvement Act states, “(A) each refuge shall be managed to fulfill the Mission of the System, as well as the specific purposes for which that refuge was established..... [Refuge System Mission] . . . to administer a national network of lands and waters for the conservation,

management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” [Refuge System Improvement Act, Section 4(a)(2)]

Refuge System resources of concern are identified in the National Wildlife Refuge System Mission, Goals, and Refuge Purposes Policy (601 FW 1). The first three Refuge System goals (601 FW 1.8) identify these resources of concern, and are stated below.

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their range.
- Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.

These Refuge System resources of concern (migratory birds, interjurisdictional fish, federally listed endangered and threatened species, and certain marine mammals) are collectively and individually referred to as Federal trust resources.

Biological integrity, diversity, and environmental health

The Improvement Act further states, “In administering the System, the Secretary shall...ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans...”

To meet this mandate the Service developed a biological integrity, diversity, and environmental health policy (BIDEH) to provide implementation guidance (601 FW 3). The policy uses historical conditions and the evaluation of a refuge at various landscape scales, including refuge, ecosystem, national, and international scales, to determine the integrity and environmental health of a refuge’s lands and its contribution to biological diversity.

Table B.3. Summary of Biological Integrity, Diversity, and Environmental Health (BIDEH) Attributes for Conte Refuge

Refuge Unit/Division	Habitats (Plant communities that represent existing BIDEH)	Habitat Attributes (Please see priority refuge resources of concern table in appendix A for details on these communities in each CFA.)	Natural Processes Responsible for these Conditions	Limiting Factors
– Salmon River – Maromas – Farmington River – Westfield River – Dead Branch – Mascoma – Ashuelot – White River – West River – Ottauquechee River – Ompompanoosuc River – Nulhegan Basin	Cliff and talus	Open outcrop, large and small, where the slope is greater than 60 degrees (Thompson and Sorenson 2000). The vegetation surrounding these outcrops varies from sparse to patches of small trees, in places forming woodland or even forest vegetation.	– Bedrock type – Temperature – Wind	– Development (wind, ski resorts) – Mining – Invasive species – Recreation overuse

Refuge Unit/Division	Habitats (Plant communities that represent existing BIDEH)	Habitat Attributes (Please see priority refuge resources of concern table in appendix A for details on these communities in each CFA.)	Natural Processes Responsible for these Conditions	Limiting Factors
<ul style="list-style-type: none"> - Whalebone Cove - Salmon River - Maromas - Farmington River - Wissatinnewag Unit - Westfield River - Dead Branch - Sprague Brook - Mascoma - Ashuelot - White River - West River - Ottauquechee River 	Woodlands (natural)	Open or sparsely wooded hilltops and outcrops or rocky slopes. The vegetation is patchy, with woodland as well as open herbaceous or grassy portions.	<ul style="list-style-type: none"> - Fire - Bedrock type 	<ul style="list-style-type: none"> - Invasive species - Lack of fire - Fragmentation
<ul style="list-style-type: none"> - Whalebone Cove 	Rocky coast and islands	A narrow zone between the high tide line and the upland or entirely surrounded by water. Cover is patchy shrubs and sparse non-woody vegetation, sometimes with a few stunted trees.	<ul style="list-style-type: none"> - Wind - Salt spray - Fog - Flooding 	<ul style="list-style-type: none"> - Invasive species - Sea level rise
<ul style="list-style-type: none"> - Whalebone Cove - Roger Tory Peterson Unit 	Salt marsh	Includes intertidal marshes where salinity levels are between 5 and 50 (ppt). Dominated by salt tolerant sedges, grasses, and rushes. May have scattered shrubs in the higher portions of the marsh.	<ul style="list-style-type: none"> - Salt spray - Flooding 	<ul style="list-style-type: none"> - Invasive species - Sea level rise - Drainage ditches
<ul style="list-style-type: none"> - Whalebone Cove - Salmon River - Muddy Brook - Maromas - Dead Man's Swamp - Westfield River - Honey-pot Wetlands Unit - Sprague Brook - Mascoma - Ottauquechee River - Fannie Stebbins 	Hardwood swamp	These swamps are dominated by deciduous trees such as red-maple, black ash, swamp white oak, and pin oak. Shrubs and herbaceous layer may include buttonbush, holly, ferns, and sedges. Saturation can vary depending on soil type and rain events.	<ul style="list-style-type: none"> - Flooding - Soil type - Fire - Drought 	<ul style="list-style-type: none"> - Development - Invasive species - Sea level rise (near CT River main stem) - Lack of fire - Heavy logging

Refuge Unit/Division	Habitats (Plant communities that represent existing BIDEH)	Habitat Attributes (Please see priority refuge resources of concern table in appendix A for details on these communities in each CFA.)	Natural Processes Responsible for these Conditions	Limiting Factors
<ul style="list-style-type: none"> – Muddy Brook – Maromas – Deadman’s Swamp – Blueberry Swamp – White River – Ottauquechee River – Nulhegan Basin – Fannie Stebbins – Hatfield Unit 	Freshwater marsh	Dominated by herbaceous vegetation with scattered shrubs and trees. The substrate is typically muck over mineral soil. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams or rivers, and/or impoundments or ditches.	<ul style="list-style-type: none"> – Flooding – Soils 	<ul style="list-style-type: none"> – Invasive species – Drainage ditches – Sea level rise
<ul style="list-style-type: none"> – Farmington River – Westfield River – Mascoma – Blueberry Swamp – Ashuelot – White River – West River – Ottauquechee River – Ompompanoosuc River – Nulhegan Basin 	Rocky outcrop	Occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades.	<ul style="list-style-type: none"> – Exposure – Fire 	<ul style="list-style-type: none"> – Lack of fire – Invasive species
<ul style="list-style-type: none"> – Mascoma – Ashuelot – White River – West River 	Peatlands	These communities’ include acidic and alkaline fens and acidic peatlands. They occur in basins or along shorelines of streams and lakes. Sphagnum moss is the dominant species, as well as grasses, low shrubs from the Ericaceae family, and stunted trees such as black spruce.	<ul style="list-style-type: none"> – Water source – Bedrock type 	<ul style="list-style-type: none"> – Adjacent development – Recreation – Peat extraction – Heavy logging adjacent to wetland
<ul style="list-style-type: none"> – White River – West River – Ottauquechee River 	Conifer swamp	<p>These swamps are dominated by coniferous trees such as northern white cedar, spruce, balsam fir, and American larch. The herbaceous and shrub layer tends to be species poor, but often depends on the soil type and pH level.</p> <p>These wetlands may remain saturated for all or nearly all of the growing season, and may have standing water seasonally.</p>	<ul style="list-style-type: none"> – Flooding – Wind – Drought 	<ul style="list-style-type: none"> – Development – Invasive species – Heavy logging

Refuge Unit/Division	Habitats (Plant communities that represent existing BIDEH)	Habitat Attributes (Please see priority refuge resources of concern table in appendix A for details on these communities in each CFA.)	Natural Processes Responsible for these Conditions	Limiting Factors
<ul style="list-style-type: none"> - White River - Ottauquechee River - Muddy Brook 	Shrub swamp and floodplain forest	<p>Shrub swamps are often associated with lakes and ponds, but are also found along streams, where the water level does not fluctuate greatly. They are commonly flooded for part of the growing season but often do not have standing water throughout the season. The system can have a patchwork of shrub and grass dominance, and trees are generally absent and, if present, are scattered.</p> <p>Floodplain forests are often dominated by silver maple, and other deciduous tree species, such as oak and ash. The understory tends to be species rich dominated by shrubs, ferns, and ephemerals. These forests occur along river systems, and are often flooded during high water events.</p>	<ul style="list-style-type: none"> - Flooding - Drought - Beaver 	<ul style="list-style-type: none"> - Clearing for agriculture - Development - Contaminants

1.2) Compile a comprehensive list of potential resources of concern

A comprehensive list of species and habitats that could be of management concern for the refuge was developed by the CCP planning team based on various conservation plans, expert opinions, species and habitat distribution maps, and current inventory data. Appendix M has a comprehensive list of these conservation plans.

Conservation plans

Sources used to compile the list of resources of concern included:

- 2008 USFWS Birds of Conservation Concern for Bird Conservation Region 30.
- 2008 USFWS Birds of Conservation Concern for Bird Conservation Region 14.
- 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.
- 2016 Federal Threatened and Endangered Species including Candidate.
- 2016 Federal Elevated Concern species petitioned for Threatened an Endangered Species.
- 2011 Technical Paper of Representative Species.
- 2009 to 2013 U.S. Fish and Wildlife Service’s Northeast Region Fisheries Program Strategic Plan.
- Silvio O. Conte National Fish and Wildlife Refuge Purpose Species.
- 2008 New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30) Implementation Plan.
- 2006 Blueprint for the Design and Delivery of Bird Conservation in the Atlantic Northern Forest (BCR 14).
- International Union for Conservation of Nature.

- 2015 New Hampshire Wildlife Action Plan.
- 2015 Vermont Wildlife Action Plan.
- 2015 Massachusetts Comprehensive Wildlife Conservation Strategy.
- 2015 Connecticut Comprehensive Wildlife Conservation Strategy.

Gather expert opinion

Between 2009 and 2012, we held various meetings in each state in the watershed—Connecticut, Massachusetts, New Hampshire, and Vermont—to discuss key issues for the refuge CCP. These meetings created an open dialogue for local experts from each state, Audubon Society, and The Nature Conservancy (TNC) to provide feedback regarding the refuges role within the Connecticut River watershed. In addition to these meetings, local experts were provided draft CCP documents for review, and given the opportunity to provide additional comments. Their feedback further developed the comprehensive list of resources of concern, and refuge habitat management direction.

The general consensus was that the refuge should take an active role in:

- Enhancing and restoring floodplain and riparian forest.
- Enhancing the health of the Connecticut River main stem and conserving aquatic species of conservation concern.
- Providing connectivity between other conservation lands.
- Conserving biologically diverse areas, and large blocks of unfragmented habitats.
- Conserving threatened and endangered species and candidate species.
- Managing forested habitats to provide a diversity of successional stages.
- Conserving habitat for migratory species including bats, fish, and landbirds.

Develop maps

We developed maps of species and habitat distributions within the watershed to assist with the development of the priority resources of concern list. The following is a list of maps used throughout the CCP process.

- Current Vegetation Map—using habitat data from TNC North East Terrestrial Habitat Mapping Project which is linked to the National Vegetation Classification System.
- Landbird species distribution and breeding bird survey relative abundance maps.
- Fisheries species distribution maps.
- Federally endangered and threatened species distribution maps.
- Existing conserved lands from TNC.
- Representative State Heritage Program maps.

Compile existing data

Partner agencies provided wildlife and plant species inventory data for proposed CFAs. Data was also compiled from surveys and inventories that were conducted on current refuge divisions. The following is a list of surveys and inventories conducted on current refuge divisions which contributed to the selection of priority resources of concern.

Landbirds

Breeding landbirds have been surveyed at Nulhegan Basin Division from 2000 to 2006 and Pondicherry Division from 2004 to 2006 and 2009 to 2011 using point count methodology, following a Regional protocol. Points were established in various habitat types, and vegetation structure data was collected at each survey point.

A Monitoring Avian Productivity and Survivorship (MAPS) banding station collected data on landbird populations within the Nulhegan Basin Division from 2003 to 2012.

Canada warblers were monitored on the Nulhegan Basin Division, as part of a larger study effort, to obtain and model habitat-specific estimates of productivity, survivorship, dispersal, and site fidelity for northeast Vermont.

Neotropical migrant birds were surveyed in four sub-watersheds of the Connecticut River including the Farmington River watershed in Connecticut, the Deerfield River watershed in Massachusetts, the Ashuelot River watershed in New Hampshire, and the White River watershed in Vermont. The goal was to determine the importance of the Connecticut River watershed to neotropical migrants, and the habitat types used most often during migration. Twelve transects were established in each sub-watershed at specific geographic locations, and each transect was surveyed 6 different times throughout the spring each year, for 3 years (1996-1998). This survey effort was part of a study conducted by Smith College and Manomet Center for Conservation Sciences, and details can be found at: <http://www.science.smith.edu/stopoverbirds/> (accessed September 2013).

Owls were surveyed on the Nulhegan Basin Division in 2000, and 2001 to 2005 using a playback methodology to determine species presence, abundance, and distribution on the refuge. Spruce grouse breeding surveys are conducted on the Nulhegan Basin Division to determine presence, abundance and distribution.

Shorebirds

American woodcock have been surveyed at Nulhegan Basin Division from 2000 to 2013 to understand woodcock relative abundance, distribution, and use of Division habitats. Spring singing ground surveys are conducted each year along road transects, and, over the past 6 years, along walking routes within three woodcock management units. Roosting surveys were conducted in the summer months of 2009 and 2010 within the roosting areas of these units.

Forest inventory

A forest-based habitat inventory was conducted on the Nulhegan Basin and Pondicherry Divisions in 2007. Approximately, 2,600 points at Nulhegan Basin and 560 points at Pondicherry were surveyed for forest stand characteristics including species composition, stand structure, understory and midstory characteristics, fuel load, age class, height class and crown closure.

Aquatic resource surveys

A biological survey of fish and macroinvertebrates was conducted on the Nulhegan Basin Division in 2000 as part of a biological diversity survey effort conducted on the former Champion International Lands. Aquatic habitat assessments investigating fish passage and in-stream features have been conducted at the Nulhegan Basin Division since 2009.

Mid-sized carnivores

Snow tracking surveys were conducted on the Nulhegan Basin Division and surrounding area to better understand lynx distribution in Vermont. Surveys were conducted during the winter of 2012. A protocol similar to the one developed in Maine to detect lynx presence was used. Other species were also documented during the survey effort including bobcat and fisher. A remote camera station was set-up in 2013 in an area that was being heavily used by lynx.

Small mammals

A small mammal inventory was conducted in 2000 on the Nulhegan Basin Division as part of a biological diversity survey effort conducted on the former Champion International Lands. Baited Sherman live traps and Museum Special snap traps were used for ground dwelling small mammals, while mist nests and acoustic monitors were used to survey bats. Bat acoustic surveys were also conducted at the Nulhegan Basin and Pondicherry Divisions in 2012 and 2013.

Natural communities and rare vascular plant inventory

Natural communities mapping and a rare plant inventory occurred in 2001 as part of a biological diversity survey effort conducted on the former Champion International Lands. Natural community mapping was updated in 2012 for new acquisition at the Nulhegan Basin Division, and in current ownership at the Blueberry Swamp Division.

Invertebrate surveys

Invertebrates have been inventoried at Pondicherry and Nulhegan Basin Division by entomologists on different occasions to determine species presence.

Waterfowl brood surveys

Waterfowl brood surveys were conducted at the Nulhegan Basin Division in 2000 as part of a biological diversity survey effort conducted on the former Champion International Lands, and conducted again in 2008.

Marsh birds

Marsh birds have been inventoried at the Nulhegan Basin Division in 2000 as part of a biological diversity survey effort conducted on the former Champion International Lands. Marsh birds were also surveyed at the Pondicherry Division in 2012 using a national and standardized protocol.

Amphibian and reptile surveys

Amphibian breeding surveys were conducted at the Pondicherry Division in 2005 and 2006, and on the Nulhegan Basin Division from 2001 to 2005 to document species presence and abundance. Survey procedures from a standardized protocol recorded species based on breeding amphibian calls. Reptiles and amphibians were inventoried using various survey methods at the Nulhegan Basin Division in 2001 as part of a biological diversity survey effort conducted on the former Champion International Lands. Survey methods include, active searches, night-time and day-time road searches, and trapping with minnow and hoop traps. Data was also collected on vernal pools including spatial data, productivity level, and pool measurements (length, width, and depth).

Invasive plant inventory

An inventory of invasive plant species has been conducted on the Nulhegan Basin Division, Pondicherry Division, Blueberry Swamp Division, Salmon River Division, Putney Mountain Unit, and Fort River Division.

2.0) Identify Potential Priority Refuge Resources of Concern in the Watershed

A comprehensive list of resources of concern was developed for the Connecticut River watershed using the information described above. These resources are a high priority for conservation based on their ranking in the specific plans identified in step 1.2. All of these species are present within the Connecticut River watershed, and species whose habitat needs are currently available or can be restored. See table B.4 for complete list of resources of concern within the watershed.

Table B.4. Comprehensive List of Resources of Concern for the Connecticut River Watershed

Species Common Name	NALCC ¹ (*NALCC representative species are in bold)	BCC (BCR 30) ²	BCC (BCR 14) ²	Federally Threatened and Endangered Species	Petitioned for Federal Listing ³	Listed in Service's Northeast Region Fisheries Strategic Plan	Listed in Refuge Purposes	BCR 30*/PIF Plan ⁵	BCR 14*/PIF Plan ⁵
Alewife	X					X	X		
American bittern		X	X					M	M
American black duck	X	X	X				X	HH	HH
American eel						X			
American oystercatcher	X	X						HH	M
American redstart									HR
American shad	X					X	X		

Process for Establishing Priority Refuge Resources of Concern

Species Common Name	NALCC ¹ (*NALCC representative species are in bold)	BCC (BCR 30) ²	BCC (BCR 14) ²	Federally Threatened and Endangered Species	Petitioned for Federal Listing ³	Listed in Service's Northeast Region Fisheries Strategic Plan	Listed in Refuge Purposes	BCR 30/PIF Plan ⁵	BCR 14/PIF Plan ⁵
American woodcock	x	x	x					HH	HH
Atlantic salmon	x					x	x		
Atlantic sturgeon				x		x			
Bald eagle		x	x				x	M	M
Baltimore oriole								HR	
Bicknell's thrush	x		x		x			H	HH, R
Black-and-white warbler								HR	
Black-billed cuckoo									HR
Blackburnian warbler									HR
Black-throated blue warbler									HR
Black-throated green warbler									HR
Blueback herring						x	x		
Blue-winged warbler	x	x	x					HH	H
Boreal chickadee									HR
Broad-winged hawk								HR	
Brook floater					x				
Brook trout	x					x			
Brown thrasher								HR	
Bufflehead		x						H	
Canada goose, Atlantic	x	x						HH	
Canada goose, north Atlantic		x	x					H	H
Canada warbler	x		x					M	HH, Y
Canada Lynx				x					
Chestnut-sided warbler									HR
Chimney swift								HR	
Cobblestone tigerbeetle					x				
Dwarf wedgemussel	x			x		x			
Eastern kingbird								HR	
Eastern towhee								HR	
Field sparrow								HR	
Gray catbird								HR	
Great crested flycatcher								HR	
Indiana bat				x					
Jesup's milk-vetch	x			x					

Species Common Name	NALCC ¹ (*NALCC representative species are in bold)	BCC (BCR 30) ²	BCC (BCR 14) ²	Federally Threatened and Endangered Species	Petitioned for Federal Listing ³	Listed in Service's Northeast Region Fisheries Strategic Plan	Listed in Refuge Purposes	BCR 30/PIF Plan ⁵	BCR 14/PIF Plan ⁵
Least tern		x						H	
Lesser yellowlegs		x	x					M	
Louisiana waterthrush								HR	
Mallard		x						H	
Marsh wren								HR	
Monarch butterfly					x				
New England cottontail rabbit	x								
Northern bog turtle				x					
Northeastern bulrush	x								
Northern flicker								HR	
Northern long-eared bat				x					
Northern parula									HR
Olive-sided flycatcher			x						H
Osprey							x		
Peregrine falcon		x	x				x		M
Pied-billed grebe		x	x						
Piping Plover	x			x				HH	HH
Prairie warbler	x	x						HH, Y	Y
Puritan tiger beetle	x			x					
Purple finch									HR
Red Knot	x	x	x	x				HH	
Regal fritillary					x				
Roseate tern				x				HH	
Rose-breasted grosbeak									HR
Ruffed grouse									HR
Rusty blackbird		x	x					H	H
Saltmarsh sparrow	x	x	x					HH, R	R
Scarlet tanager								HR	
Seaside sparrow	x	x						M, Y	
Semipalmated sandpiper	x	x	x					H	HH
Short-billed dowitcher		x						H	H
Shortnose sturgeon	x			x		x	x		
Small-whorled pogonia	x			x					
Snowy egret		x	x					M	

Species Common Name	NALCC ¹ (*NALCC representative species are in bold)	BCC (BCR 30) ²	BCC (BCR 14) ²	Federally Threatened and Endangered Species	Petitioned for Federal Listing ³	Listed in Service's Northeast Region Fisheries Strategic Plan	Listed in Refuge Purposes	BCR 30/PIF Plan ⁵	BCR 14/PIF Plan ⁵
Solitary sandpiper		X	X					H	
Tri-colored bat					X				
Veery									HR
Whip-poor-will		X						H	M
Willow flycatcher								HR	
Wood duck			X					M	M
Wood thrush	X	X	X					HH, Y	HH, Y
Wood turtle					X				
Worm-eating warbler		X						H	
Yellow banded bumble bee					X				
Yellow-bellied sapsucker									HR
Yellow-throated vireo								HR	

Reference Notes:

¹ LCC–2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan; species of concern

² BCC (BCR 30, 14)-2008 USFWS Birds of Conservation Concern for Bird Conservation Regions 30 and 14. Note: The resident game species and waterfowl were added to this list from the Land Acquisition Priority System.

³ Species petitioned to be federally listed as threatened or endangered as of 2016.

⁴ BCR–Bird Conservation Region Plans–Rankings: HH–highest; H–high; M–medium; HR–high BCR responsibility

⁵ Species of Continental Concern from 2016 Partners in Flight Landbird Conservation Plan. R (red) = species with extremely high vulnerability due to small population, range, threats, and rangewide declines. Y (yellow) = species not declining but vulnerable due to small range or population and moderate threats, or species in decline due and moderate to high threats (Rosenberg, et al, 2016).

3.0) Select priority refuge resources of concern for refuge units and proposed CFAs

The “Comprehensive list of refuge resources of concern for the Connecticut River watershed” addresses a broad range and high number of conservation needs. This list is too broad and extensive, and does not allow for focused and effective resource conservation within each CFA or refuge unit. Priority refuge resources of concern were selected from this comprehensive list using a “focal resources” concept. Focal resources are associated with conditions that represent the needs of larger groups of species that have similar requirements and respond to management similarly (Pavelgio and Taylor 2010). The species selected will prioritize and focus management within individual CFAs, and units that are located outside of a CFA boundary. Occasionally, we chose a priority “resource” that is not a species, but a species group, habitat, or natural community type, such as migratory birds, floodplain forests, or large contiguous grasslands.

When available, we used existing wildlife inventory data and current information on habitat conditions to inform our selection of priority refuge resources of concern for each CFA and refuge unit. This data was often available for CFAs with existing refuge divisions (e.g., Pondicherry and Nulhegan Basin) and for refuge units. However, this data is generally limited to the acres we currently own, and not to the entire CFA located outside the existing refuge division boundary. Where this data was not available, the habitats and wildlife species—and their condition—were analyzed using only coarse-scale information. This included the careful analysis of spatially-explicit habitat data using GIS (Geographic Information Systems), the consultation of local and state experts and conservation plans, and an understanding of forest disturbance and land use history in New England. This allowed identification of broad habitat types and the selection of “preliminary” priority refuge resources of concern that are associated with habitat type attributes. These preliminary species will be further refined when the Service acquires land within these CFAs. A comprehensive, multi-scale wildlife and habitat inventory will be conducted providing baseline information to further inform priority refuge resources of concern, and provide more detailed habitat prescriptions required within a step-down HMP.

The priority refuge resources of concern for each CFA and refuge unit was chosen from the Connecticut River watershed priority resources of concern list, and based on the following criteria:

- (1) Is there a federally threatened or endangered species, a Federal candidate species, a species petitioned for Federal listing or a species mentioned in the refuge’s purposes currently present in a CFA or unit (e.g., puritan tiger beetle). If yes, then the species is a priority.
- (2) For species whose core range is within the CFA or refuge unit, and management for them will benefit other priority species. If yes to all of these questions, then the species is a priority:
 - Is the species distributed throughout the CFA, and/or is the CFA within the core of their breeding/migratory/wintering range?
 - Does the CFA provide the habitat to support this species?
 - Will this species respond well to management?
 - Does the species have the highest ranking, and will management for this species also benefit a suite of species that rely on similar habitat types and structure (e.g., wood thrush, American black duck)?
- (3) Does the species have habitat needs that will not be addressed through management of other chosen priority species, and is currently present in a CFA or refuge unit (e.g., blackburnian warbler). If yes, then the species is a priority.
- (4) Is there a habitat type within the CFA or refuge unit that is not necessarily being managed for a particular priority species of concern due to the habitat type, small patch size or location, but nonetheless, is important to conserve for its contribution to BIDEH or ecosystem processes and function? If yes, then the habitat is a priority.

Species that met the criteria above, but are also listed in state Wildlife Action Plans, under the International Union for Conservation of Nature and/or are a North Atlantic LCC representative species, then the species was given a higher ranking under criteria number 2. Please see the “Process to Determine CFA Priority Refuge Resources of Concern” table for each CFA and in appendix A of the final CCP/EIS.

Table B.5 shows the priority refuge resources of concern for the proposed CFAs and existing refuge units by habitat type. This is a comprehensive list of species and is not associated with any particular CFA or refuge unit. The species were selected based on the criteria above, and influenced by the location of the CFA or refuge unit in the watershed, size of the CFA or refuge unit, habitat type and patch size, and species presence. New England cottontail, for instance, is a priority refuge resource of concern in three CFAs in the southern portion of the watershed only. Northeastern bulrush is a federally listed species that occurs in freshwater marshes in one CFA and one refuge unit only in southern Vermont. Please see appendix A in the final CCP/EIS for priority refuge resources of concern for each CFA.

Habitats are also listed as priority refuge resources of concern because they contribute to BIDEH (see criteria #4). Some of these habitats have been impacted by development, and are now rare in the landscape (e.g., floodplain forest). A summary of existing habitats that contribute to BIDEH is provided in table B.3. Habitats that have been impacted by development, and are in need of restoration are listed in table B.5.

Table B.5. Priority Refuge Resources of Concern for CFAs by Habitat Type

(Preliminary) Priority Refuge Resources of Concern	Habitat Type	Habitat Structure
Wood thrush	Hardwood forest	Breeding habitat includes contiguous mature forests (80 years old or older) 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).
Chestnut-sided warbler		Breeding habitat includes early successional deciduous forested upland and wetland (Richardson and Brauning 1995).
American woodcock		Breeding and roosting habitat includes young deciduous and mixed forests (1 to 20 years old) dominated by aspen and birch, and 3-acre or larger forest openings with 60 percent shrub cover, in proximity to alder wetlands and herbaceous openings (Sepik et al. 1981, Kelley Jr et al. 2008).
Black-throated blue warbler		Breeding habitat includes mature deciduous and mixed deciduous-conifer forests with a shrubby understory (Rosenberg and Hodgman 2000, DeGraaf and Yamasaki 2001, Dobbs et al. 2007).
Blackburnian warbler		Breeding habitat includes mature conifer, and conifer-deciduous forests (80 years or older) (Rosenberg and Hodgman 2000, DeGraaf and Yamasaki 2001, Morse 2004).
Canada warbler		Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 feet within greater than 30 percent canopy closure, a dense foliar mid-story and well developed shrub layer 7 to 20 feet in height, and moist soils (Lambert and Faccio 2005, Chace et al. 2009).
Louisiana waterthrush		Breeding habitat includes contiguous (250 or greater acres) mature deciduous or mixed-wood forests along medium to high-gradient, first to third-order, perennial streams (DeGraaf and Yamasaki 2001, Mattsson et al. 2009).
New England cottontail		Year-round habitat includes dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 0.6 miles (1 kilometer) of each other (DeGraaf and Yamasaki 2001, Arbutnot 2008).
Tri-colored bat Northern long-eared bat Indiana bat		Caves used for hibernation. 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 to 14 inches diameter at breast height (dbh)) and travel corridors to water are also important (DeGraaf and Yamasaki 2001, Darling Guidelines, unpublished).
Small-whorled pogonia		Inhabits upland sites in maturing stands of deciduous or mixed deciduous and coniferous forests with sparse-to-moderate ground cover (due to nutrient poor soils), a relatively open understory, and proximity to persistent openings in the forest canopy, such as logging roads and streams.
Bald eagle osprey (breeding and migrating only)		Breeding, migrating, and wintering 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 and Yamasaki 2001).

(Preliminary) Priority Refuge Resources of Concern	Habitat Type	Habitat Structure
Blackburnian warbler	Spruce-fir forest	Breeding habitat includes mature conifer, and conifer-deciduous forests (80 years or older) (DeGraaf and Yamasaki 2001, Morse 2004).
Rusty blackbird		Breeding habitat includes conifer dominated forested wetlands interspersed with shrub swamps and peatlands. Young spruce and fir may be required for nesting (Greenberg and Matsuoka 2010, Matsuoka et al. 2010, Powell et al. 2010).
Canada warbler		Breeding habitat includes contiguous deciduous, mixed-wood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 feet within greater than 30 percent canopy closure, a dense foliar mid-story and well developed shrub layer 7 to 20 feet in height, and moist soils (Lambert and Faccio 2005, Chace et al. 2009).
Rusty blackbird	Hardwood swamps	Wintering habitat includes floodplain forests, hardwood swamps, and shrub wetlands (C. Foss, Audubon New Hampshire, personal communication 2016).
Canada warbler	Hardwood swamps	Breeding habitat includes contiguous deciduous, mixed-wood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 feet within greater than 30 percent canopy closure, a dense foliar mid-story and well developed shrub layer 7 to 20 feet in height, and moist soils (Lambert and Faccio 2005, Chace et al. 2009).
	Conifer swamps	
American woodcock	Shrub swamps and floodplain forests	Foraging habitat includes alder dominated wetlands in proximity to early successional forests, shrublands and herbaceous openings (Sepik et al. 1981, Kelley Jr et al. 2008).
American black duck		Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf and Yamasaki 2001).
New England cottontail		Year-round habitat includes shrub swamps of at least 25 acres that are within 0.6 miles (1 kilometer) of other shrub swamps, and early successional forest patches (DeGraaf and Yamasaki 2001, Arbuthnot 2008).
Tri-colored bat Indiana bat Northern long-eared bat		Caves used for hibernation. 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 to 14 inches dbh) and travel corridors to water are also important (DeGraaf and Yamasaki 2001, Darling Guidelines, unpublished).
Rusty blackbird		Wintering habitat includes floodplain forests, hardwood swamps, and shrub wetlands (C. Foss, Audubon New Hampshire, personal communication 2016).
American black duck	Freshwater marshes	Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf and Yamasaki 2001).
Snowy Egret		Foraging habitat includes shallow pools, freshwater wetlands, and tidal flats within the vicinity of nesting areas (DeGraaf and Yamasaki 2001).
Northeastern bulrush		Year-round habitat includes herbaceous wetlands with seasonally fluctuating water levels (USFWS 2006).
American black duck	Peatlands	Breeding and migrating habitat includes herbaceous wetlands, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf and Yamasaki 2001).

(Preliminary) Priority Refuge Resources of Concern	Habitat Type	Habitat Structure
American woodcock	Pasture/hay/ grassland	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 (Sepik et al. 1981, Kelley Jr et al. 2008).
New England cottontail		Year-round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 0.6 miles (1 kilometer) of each other (DeGraaf and Yamasaki 2001, Arbuthnot 2008).
Floodplain communities (restoration) *supports migratory birds, wood turtle, and bat species*		<i>Laurentian-Acadian floodplain forest</i> occurs along medium to large rivers, and include a matrix of upland and wetland habitats. Floodplain forests, with silver maple are characteristic, as well as herbaceous sloughs and shrub wetlands. Most areas are underwater each spring; micro-topography determines how long the various habitats are inundated. Associated trees include red maple and American hornbeam, the latter frequent but never abundant. On terraces or in more calcium rich areas, sugar maple or red oak may be locally prominent, with yellow birch and ash, black willow is characteristic of the levees adjacent to the channel. Common shrubs include silky dogwood and viburnum. The herb layer in the forested portions often features abundant spring ephemerals, giving way to a fern-dominated understory in many areas by mid-summer. Non-forested wetlands associated with these systems include shrub-dominated and grass-non-woody vegetation (Gawler et al. 2008).
Managed grasslands (large contiguous acreage only) *supports yellow banded bumble bee, monarch butterfly, regal fritillary, grassland birds*		These habitat types include ruderal uplands (recently disturbed areas) and old-fields such as abandoned pastures; lands that are intensively managed for cool season grasses, such as Canada rye, redtop, 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 et al. 2008).
New England cottontail	Old fields and shrublands	Year-round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (DeGraaf and Yamasaki 2001, Arbuthnot 2008).

(Preliminary) Priority Refuge Resources of Concern	Habitat Type	Habitat Structure
Brook floater	Water	Year-round habitat includes creeks and small rivers, prefers the stable bank conditions afforded by gravel or sandy substrates, and good water quality (Nedeau 2008).
Atlantic salmon		Spawn in cold freshwater moving streams with coarse clean gravel and adequate food and cover. Migrate in large rivers (Kart et al. 2005).
Brook trout		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 (Kart et al. 2005).
Atlantic Sturgeon		(DeGraaf and Yamasaki 2001)
American shad		Spawn when the water temperature is above 60 degrees Fahrenheit in shoal area of river and lower reaches of larger tributaries (USFWS 1996).
American black duck		Migrating and wintering habitat includes open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging (DeGraaf and Yamasaki 2001).
American eel		Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996).
Dwarf wedgemussel		Year-round habitat includes creeks and small rivers, prefers the stable bank conditions afforded by gravel or sandy substrates, and good water quality (USFWS 1993, Nedeau 2009).
Shortnose sturgeon		Spawn in slow-moving, 48°F water of large rivers, and feed in fresh and brackish water along the river bottom (USFWS 1996).
Blueback herring		Spawn in fast moving, shallow water when the river temperature is about 58°F (USFWS 1996).
Alewife		Spawn in ponds and slow-moving streams (USFWS 1996).
Migratory species (e.g., birds and bats)	River shoreline	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 Connecticut River watershed is also important for migratory waterfowl and bat species.
Puritan tiger beetle		Breeding and wintering habitat includes sparsely vegetated or open sandy beaches along large rivers where river flow dynamics restrict woody plant growth (Hill and Knisley 1993).
Cobblestone tigerbeetle		Breeding and wintering habitat includes sparsely vegetated sandy cobble beaches on the banks or upstream side of islands in free-flowing rivers (Pyzikiewicz 2006).
Jesup's milk-vetch		Riverside rock outcrops and ledges of the Connecticut River (USFWS 1989).

(Preliminary) Priority Refuge Resources of Concern	Habitat Type	Habitat Structure
Piping plover	Dunes and Maritime Grasslands	Breeding and migratory habitat includes sandy beaches and tidal mudflats. Nest sites are shallow scraped depressions in sandy areas with little or no vegetation.
Red knot		Migratory habitat includes sandy beaches, tidal mudflats, and salt marshes where bivalves, gastropods, and crustaceans are available for foraging.
Roseate tern		Sandy beaches and tidal mudflats during migration, especially at the mouth of the Connecticut River.

The following table (table B.6) identifies high refuge priority habitats for each CFA and refuge unit that will be a priority for active management in the next 15 years. These priority habitats are subject to change once land is acquired within the CFA and a wildlife and habitat inventory has been conducted. Active management will likely not occur within the majority of refuge units, except where federally listed species occur, due to the small acreage and habitat patch sizes (refuge units range between 3 to 285 acres). Therefore, we do not list all refuge units in this table.

Table B.6. Habitat Priorities at Conte Refuge

CFA or Refuge Unit	Priority I Habitats	
	Habitat Type	Reasons for Ranking
Whalebone Cove	Freshwater marsh	Significant acreage in CFA; part of lower Connecticut River tidal wetland system; habitat for American black duck, semipalmated sandpiper, migratory waterfowl, and shorebirds.
	Hardwood forest	Diversity of species rely on habitat, including New England cottontail (Federal candidate species), wood thrush, and Louisiana waterthrush, contiguous tract rare in southern portion of watershed.
	Shrub swamps and floodplain forests	Small in acreage but part of the tidal wetland system of the lower Connecticut River, New England cottontail, American black duck, American woodcock, and migratory waterfowl.
Scantic	Floodplain forest (currently agriculture)	Impacted by development/agriculture, uncommon habitat in the Connecticut River watershed; restoration necessary, significant for migrants.
	Hardwood swamp	Within the floodplain of the Connecticut River; potential impacts by development/agriculture; benefits migratory species.
	Freshwater marsh	Within the floodplain of the Connecticut River; potential impacts by development/agriculture; benefits migratory waterfowl species.
Salmon River	Hardwood forest	Diversity of species rely on habitat, including New England cottontail (Federal candidate species), wood thrush, and Louisiana waterthrush; and contiguous tract of hardwood forest rare in southern portion of watershed.
	Shrub swamps and floodplain forests	Part of lower Connecticut River tidal wetland system; provides habitat for New England cottontail, American black duck, American woodcock, and migratory waterfowl.
	Freshwater marsh	Part of lower Connecticut River tidal wetland system; provides habitat for American black duck, other migratory waterfowl, and shorebirds.

CFA or Refuge Unit	Priority I Habitats	
	Habitat Type	Reasons for Ranking
Muddy Brook	Shrub swamp and floodplain forest	Impacted by development/agriculture; uncommon habitat in the Connecticut River watershed; significant for migrants.
	Grasslands (currently agriculture)	Uncommon contiguous large block of grassland habitat; provides habitat for declining grassland species.
	Hardwood swamp	Within the floodplain; large acreage in CFA; potential impacts by development/agriculture; provides habitat for migratory species.
Pyquag	Floodplain forest (currently agriculture)	Impacted by development/agriculture; uncommon habitat in the Connecticut River watershed; restoration necessary; significant for migrants.
	Hardwood swamp	Impacted by development/agriculture; uncommon habitat in the Connecticut River watershed; restoration necessary; significant for migrants.
	Freshwater marsh	Impacted by development/agriculture; uncommon habitat in the Connecticut River watershed; restoration necessary; used by migratory waterfowl.
Maromas	Hardwood forest	Contiguous tract rare in southern portion of watershed; connects to other large forest tracts; diversity of species rely on habitat, including wood thrush and Louisiana waterthrush.
	Shrub swamps and floodplain forests	Adjacent to Connecticut River, significant in size, American black duck, migratory waterfowl.
Farmington River	Hardwood forest	Diversity of species rely on habitat including New England cottontail (Federal candidate species), wood thrush, and Canada warbler; contiguous tract rare in southern portion of watershed.
	Shrub swamps and floodplain forests	Provides habitat for New England cottontail, American black duck, and American woodcock; large tract in CFA.
	Freshwater marsh	Provides habitat for American black duck; large tract in CFA.
Westfield River	Hardwood forest	Diversity of species rely on habitat including wood thrush, blackburnian, woodcock, and Canada warbler; contiguous tract, undeveloped landscape; connectivity, riparian buffer.
	Shrub swamps and floodplain forests	Provides habitat for American woodcock and American black duck.
Mill River	Floodplain forest (currently agriculture)	Impacted by development/agriculture; uncommon habitat in the watershed; restoration necessary; significant for migratory species.
	Hardwood swamp	Within the floodplain of the Connecticut River; potential impacts by development/agriculture; migrants.
	Freshwater marsh	Within the floodplain of the Connecticut River; potential impacts by development/agriculture.
Fort River	Floodplain forest (currently agriculture)	Impacted by development/agriculture; uncommon habitat in the watershed; restoration necessary; significant for migratory species.
	Grasslands (currently agriculture)	Uncommon to have a contiguous large block of grassland habitat; declining grassland species.

CFA or Refuge Unit	Priority I Habitats	
	Habitat Type	Reasons for Ranking
Dead Branch	Hardwood forest	Diversity of species rely on habitat including wood thrush, blackburnian, woodcock, and Canada warbler; contiguous tract, undeveloped landscape; connectivity, riparian buffer.
	Shrub swamps and floodplain forests	Provides habitat for American woodcock and American black duck.
	Freshwater marsh	Within a large wetland complex; provides habitat for American black duck.
Sprague Brook	Hardwood forest	Diversity of species rely on habitat including wood thrush, blackburnian, woodcock, and Canada warbler; contiguous tract; undeveloped landscape; connectivity.
	Shrub swamps and floodplain forests	Part of a larger wetland complex; provides habitat for a diversity of species, including American woodcock, American black duck, rookery.
	Freshwater marsh	Part of a larger wetland complex, provides habitat for a diversity of species, including American black duck.
Pondicherry	Spruce-fir	Supports rare boreal species and species of conservation concern; provides forest buffer for numerous streams in CFA; contiguous forest.
	Peatlands	Uncommon habitat type in landscape; sensitive habitat, unique plant species; provides habitat for black ducks; surrounds remote ponds.
	Shrub swamps and floodplain forests	Part of a larger wetland complex; supports American black duck and American woodcock.
Mascoma	Hardwood forest	Diversity of species rely on habitat including wood thrush, blackburnian, woodcock, and Canada warbler, contiguous tract, undeveloped landscape; connectivity, riparian buffer.
	Shrub swamps and floodplain forests	Part of a larger wetland complex; supports American black duck and American woodcock.
	Conifer swamp	Provides riparian buffer; part of a larger wetland complex; supports Canada warbler.
Blueberry Swamp	Spruce-fir	Supports rare boreal species; provides forest buffer for numerous streams in CFA; contiguous forest.
	Shrub swamps and floodplain forests	Large block of shrubland habitat; part of a larger wetland complex, supports American black duck and American woodcock.
	Conifer swamp	Large cedar swamp; part of a larger wetland complex; supports unique species and Canada warbler.
Ashuelot	Hardwood forest	Diversity of species rely on habitat, including wood thrush, blackburnian, woodcock, and Canada warbler; contiguous tract; undeveloped landscape; connectivity, riparian buffer.
	Shrub swamps and floodplain forests	Part of a larger wetland complex; supports American black duck and American woodcock.
	Freshwater marsh	Part of a larger wetland complex; supports diversity of species, including American black duck.

CFA or Refuge Unit	Priority I Habitats	
	Habitat Type	Reasons for Ranking
White River	Hardwood forest	Diversity of species rely on habitat, including wood thrush, chestnut-sided warbler, and bats; contiguous tract; undeveloped landscape; connectivity; riparian buffer.
West River	Hardwood forest	Diversity of species rely on habitat, including wood thrush, blackburnian, woodcock, and Canada warbler; contiguous tract; undeveloped landscape; connectivity; and riparian buffer.
	Shrub swamps and floodplain forests	Large block in CFA; supports American black duck and American woodcock.
	Freshwater marsh	Large block in CFA; diversity of species; potential for northeastern bulrush; supports American black duck.
Ottauquechee	Hardwood forest	Diversity of species rely on habitat, including wood thrush, chestnut-sided warbler, and bats; contiguous tract; undeveloped landscape; connectivity; riparian buffer.
Ompompanoosuc	Hardwood forest	Diversity of species rely on habitat, including wood thrush, blackburnian, woodcock, and bats; contiguous tract; undeveloped landscape; connectivity; riparian buffer.
	Shrub swamps and floodplain forests	Supports American black duck, bats, and American woodcock.
	Freshwater marsh	Supports American black duck.
Nulhegan Basin	Spruce-fir	Supports rare boreal species and species of conservation concern; forest buffer for numerous streams in CFA; contiguous forest; connectivity.
	Shrub swamps and floodplain forests	Supports American black duck and American woodcock.
	Peatlands	Uncommon habitat type in landscape; sensitive habitat; unique plant species; black ducks; surrounds remote ponds.
Putney Mountain Unit	Freshwater marsh	Northeastern bulrush, a federally listed species, occurs in wetlands.
Deadman's Swamp Unit	River shoreline	Puritan tiger beetle, a federally listed species, occurs along the Connecticut River.
Saddle Island	River shoreline	Jessup's milkvetch, a federally listed species, occurs along the Connecticut River
Hatfield Unit	Freshwater marsh	Within the floodplain; potential impacts by development/ agriculture; provides habitat for migratory species.
Fannie Stebbins	Hardwood Swamp	Within the floodplain; potential impacts by development/ agriculture; provides habitat for migratory species.
	Freshwater marsh	Part of a larger wetland complex; supports diversity of species, including American black duck.

From the onset of the CCP process, wildlife partners from the states of Vermont, New Hampshire, Massachusetts, and Connecticut have been involved with the selection of priority resources and the development of refuge goals and objectives. Throughout the process, differing agency goals were apparent. However, participative planning with professional wildlife stakeholders is useful to address issues that may otherwise result in controversy. The additional time and effort that is needed to identify priority habitats that offer commonality with partners' goals is worthwhile and results in more broadly accepted decisions (Sportza 1999).

The planning team determined the most appropriate biological goals and objectives for the refuge based on Refuge System policy, and then found commonalities with the state partners in meeting state wildlife habitat goals. The freshwater wetlands and resources of concern that were identified as priorities for the refuge, overlap with state wetland goals. The mixed spruce-fir/northern hardwood forest contributes to state goals for the priority landbird species that were chosen, as well as provide habitat for other state species of concern. The mixed forest will provide connectivity of habitats for mammals with large home ranges and protection of white-tailed deer wintering areas. Many State Species of Greatest Conservation Need are listed as associated species or species that are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the refuge priority resource of concern. These species are listed with the priority refuge resources of concern to provide a broader scope of species conservation within each CFA. See appendix A of the final CCP/EIS for the compilation of priority refuge resources of conservation concern and associate species for each CFA and refuge unit.

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