

Connecticut River



USFWS

Connecticut River from Mount Sugarloaf overlook

Connecticut River Main Stem and Major Tributaries

- Quonatauck Conservation Focus Area (Proposed)

Overview Quonotuck Conservation Focus Area (Proposed)

Along the main stem of the Connecticut River and its tributaries in Vermont, New Hampshire, Connecticut, and Massachusetts

Conservation Focus Area (CFA)—Acreage Profile	Acres
Total Acres in CFA*	8,000

*These 8,000 acres are not tied to any specific parcels. The Service does not plan to acquire existing conserved lands along the Connecticut River main stem and will only acquire lands from willing sellers.

What other special considerations were made in delineating the boundaries of the proposed CFA?

The Quonotuck CFA represents the riparian areas directly adjacent to the main stem of the Connecticut River and the lower reaches of thirteen of its major tributaries (see map A.2 below). The CFA’s boundary approximates the 100-year floodplain for the main stem and these thirteen tributaries, as defined by the Federal Emergency Management Agency (FEMA; <http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping#2>; accessed March 2015). Our priority would be conserving floodplain forests and wetlands, as well as tidal (salt, brackish, and freshwater) wetlands. We would seek to protect these habitats were they currently occur, where they can be restored, and/or where they are projected to migrate to in the future due to climate change. We would particularly focus on conserving ownerships that include river frontage. The Quonotuck CFA represents approximately 1,500 acres of tidal marsh and floodplain habitat along the mouth and lower extremities of the river in Connecticut, approximately 1,500 acres of floodplain forest along the river and major tributaries in Massachusetts, and approximately 5,000 acres of floodplain forest along the upper portion of the river and major tributaries and distributed evenly between New Hampshire and Vermont

The 8,000 acres targeted for the Quonotuck CFA is in addition to the acreage identified for the six other CFAs that occur within the 100-year floodplain of the Connecticut River and its major tributaries (map A.2).

What are the priority habitat types within the proposed CFA?

The priority habitats within the Quonotuck CFA are tidal (salt, brackish, and freshwater) wetlands, floodplain forests, and riparian areas along the main stem of the Connecticut River and its major tributaries.

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

1. Federal Threatened and Endangered Species

At least nine federally threatened, endangered, and candidate species occur in the Quonotuck CFA. These include shortnose sturgeon, dwarf wedgemussel, Atlantic sturgeon, Puritan tiger beetle, Jesup’s milk-vetch, American eel, piping plover, red knot, and New England cottontail.

This CFA will contribute to the conservation of the federally endangered dwarf wedgemussel. This species requires stable bank conditions and high water quality (U.S. Fish and Wildlife Service 1993, Nedeau et al. 2000). This mussel is threatened by habitat loss, fragmentation and altered river processes (Nedeau 2009).

American eel, a species petitioned for Federal listing also occurs in the Connecticut River and tributaries. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit coves, 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).

Shortnose sturgeon and Atlantic sturgeon use habitats in the lower portion of the Connecticut River. Sections of the main stem in Massachusetts are important migrating habitat for shortnose sturgeon, while certain sections in Connecticut are critical spawning and overwintering habitat for this species. Juvenile Atlantic sturgeon were recently documented in the lower portion of the Connecticut River (S. Gephard, CTDEEP, personal communication 2015). This Federal endangered species and a species of greatest conservation need in Connecticut, were once considered extirpated in the Connecticut River, as reproduction no longer occurred in the main stem (Sprankle personal communication 2014). The documentation of juveniles provides a higher probability that there are opportunities to recover this species in the Connecticut River.

The remaining five listed or candidate species occur in habitats directly adjacent to the river and its tributaries. The federally threatened Puritan tiger beetle occur in two populations along the Connecticut River—one in Massachusetts owned by the City of Northampton and Massachusetts Division of Fisheries and Wildlife and another partially occurring on the refuge's Dead Man's Swamp Unit in Connecticut. The Recovery Plan for this species was issued in 1993 (USFWS 1993b). The recovery plan called for a minimum of three metapopulations established or maintained along the species historic range along the Connecticut River. The 2007 5-year review recommended that a high priority be given to identifying private landowners that would be willing to enter into conservation easements for the protection and management of Connecticut River shoreline habitat supporting beetles (USFWS 2007).

The only three known populations of the endangered plant Jesup's milk-vetch occur along the main stem in New Hampshire and Vermont, all in the Quonotuck CFA. The Recovery Plan for this species was issued in 1989 (USFWS 1989b). The protection of the populations was a high priority in the recovery plan. The 5-year review in 2008 stated that the plant continued to experience a high degree of threat and that the three populations along the Connecticut River should be permanently protected by acquisition/conservation easements or through long-term management agreements. The 2009 spotlight action plan specifically highlights land acquisition by the refuge as part of the Service's role and responsibility in the species' protection and recovery (USFWS 2009).

Also, the federally threatened piping plover occurs in one location along a 1-mile sand spit owned by The Nature Conservancy at the mouth of the Connecticut River. Red knot, which is proposed as threatened, also occurs in the same habitats as the piping plovers. The range of the federal candidate New England cottontail includes the Lower Connecticut River watershed and may be found in several locations in the Quonotuck CFA.

2. Migratory Birds

The floodplain forest, fresh and tidal wetlands, and riparian habitats along the main stem of the Connecticut River are especially important to migrating birds, such as waterfowl, rails, raptors, and songbirds (Dreyer and Caplis 2001). Species that use these habitats include American black duck, American bittern, snowy egrets, marsh wrens, willow flycatchers, semipalmated sandpiper, and rusty blackbirds.

A study of spring stopover habitat use by Neotropical migrant birds within the Connecticut River Valley (<http://www.science.smith.edu/stopoverbirds/index.html>; accessed March 2015) conducted by Smith College through funding by the Service provides indications of the importance of the Connecticut River watershed to migrating birds. During a 3-year study (1996 to 1998), observers conducted 8,640 point count surveys and counted a total of 102,259 birds. The results demonstrated that spring migrant birds using the Eastern Flyway reach the southern portions of the Connecticut River watershed in large numbers, then disperse throughout the watershed and beyond as they continue north. Almost half (47 percent) of the birds counted within the defined count circles were at sites along the main stem of the Connecticut River. This trend was even more pronounced along the Connecticut and Massachusetts portions of the river and during the early periods of spring migration. Forested wetlands and shrub swamps are likely to be particularly valuable habitats along the main stem of the river because they provide more food and protection earlier in the spring migratory period due to warmer air and water temperatures and earlier tree leaf-out. Overall density of birds observed decreased by about half from south to north, as birds dispersed away from the main stem of the river as they moved north. The mouth and lower main stem of the Connecticut River may serve as a landscape feature used by many Eastern Flyway migrants to orient north after reaching the southern New England coast. The results of this study suggest that habitat protection within the Connecticut River watershed will have significant benefits for supporting neotropical migrants during the spring migratory period, especially forest and shrub wetlands along the southern third of the main stem.

3. Waterfowl

The lower Connecticut River has abundant waterfowl year-round and has some of the highest and most significant concentrations of black duck in the Northeastern United States (Dreyer and Caplis 2001). The freshwater and tidal wetlands along the Connecticut River, particularly in the lower portion of the watershed, provide important stopover habitat during both spring and fall migrations for waterfowl, such as American black duck. The habitats most important to black duck are the tidal wetlands along the main stem, as well as the tidal wetlands and bays along the coast. In the winter, the river provides relatively ice-free open water habitat providing access to submerged aquatic vegetation, invertebrates and high-calorie wetland vegetation. Many waterfowl also nest along the river, including mallards, black duck, Canada goose, green-winged teal, and gadwall.

Further north in the watershed, many migrating ducks use flooded agricultural fields, floodplains, emergent wetlands, shrub swamps, and backwater areas along the Connecticut River for stopover habitat. In fact, the Connecticut River is a waterfowl focus area under the Atlantic Coast Joint Venture for New Hampshire and Vermont, highlighting the importance of the river habitats to breeding and migrating waterfowl (ACJV 2005, NHFG 2006). Species such as Canada geese, teals, mergansers, American black ducks, mallards, wood duck, and some sea ducks use the river corridor during spring and fall migration. The river provides prime breeding habitat for American black duck, wood duck, mallard, common merganser, and Canada geese. Other species nest along the river, but are less common.

4. Diadromous fish and other aquatic species

In addition to the aquatic species mentioned above under “Federal Threatened and Endangered Species,” the Connecticut River is home to a variety of anadromous fish and other aquatic species including alewife, blueback herring, Atlantic salmon, Atlantic sturgeon, and American shad. Brook trout are also present, but use cold water tributaries and are more common in the northern portion of the watershed. This high number of priority aquatic species is an indication of the diversity of habitats provided by the Connecticut River and its extensive tributaries. One of the major threats to these species is the large number of dams along the Connecticut River and its tributaries, which are obstacles to migratory fish and other aquatic species passage.

5. Wetlands

There is a large diversity of important wetlands along the Connecticut River main stem and its tributaries. These include floodplain and riparian forests that improve water quality for plants, fish, wildlife, and a very large urban and suburban human population. These riparian wetlands are also important for absorbing impacts from increasingly more frequent storm events where coastal and inland flooding can negatively impact habitats and human infrastructure. The protection and restoration of these habitats is critical to becoming more resilient to climate change.

Other wetlands of significance include the tidal wetlands complex in southern Connecticut which was designated “Wetland of International Importance” by the Ramsar Convention. The Ramsar designation is used for wetland complexes that have international significance in terms of ecology, botany, zoology, limnology, or hydrology. The Connecticut River designated area contains 20,570 acres and consists of 20 discreet major wetland complexes. The lower tidal wetlands complex is considered the best example of this type anywhere in the Northeastern United States and is the most pristine large river marsh system in the Northeast.

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

Our major habitat management would be habitat restoration and conservation, particularly restoring and maintaining floodplain forest, tidal wetlands, and forested buffers along the river and its tributaries.

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

We would seek to provide recreational access to the river for priority public uses (hunting, fishing, wildlife observation and photography, interpretation, and environmental education) consistent with the applicable final compatibility determinations.

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

In addition to the Ramsar designation mentioned above, the Connecticut River is designated as National Blueway and an American Heritage River. There are also at least five Important Bird Areas (IBAs) in the Connecticut River watershed: Lower Connecticut River Valley IBA, Station 43 IBA, Herrick's Cove IBA, Barton's Cove—Poet's Seat IBA, and Longmeadow Flats IBA.

How would increased land protection within this CFA help the Service and other conservation landowners adapt and respond to climate change? For example, do these lands significantly contribute to representation, resiliency, and connectivity across the watershed?

The Connecticut River is a free-flowing river for its entire extent in the State of Connecticut. The first dam on the main stem is located in Holyoke, Massachusetts. Its head of tide, the point within the river system where the daily flushing of the tides does not affect the level, is located near Hartford, Connecticut. The barrier-free segment of the river in the State of Connecticut creates opportunities for the emigration of the coastal wetland complex from the Long Island Sound. This CFA is strategically placed to allow that migration to occur. Tidal salt, brackish, and freshwater wetlands along with other floodplain wetlands and forests will be a priority for protection within this CFA. As the sea level changes, the tidally influenced coastal wetland complex will have room to move inland, given suitable soils slopes and other factors.

A major goal is to work with the rest of the conservation community to promote, maintain, and/or enhance both terrestrial and aquatic ecosystems connectivity. Critical connections exist not only between aquatic systems, but also between the Connecticut River uplands, lowlands and floodplain. This CFA facilitates that connectivity and provides more flexibility to adapt to land use and climate change. Strategically protecting land within this CFA could promote near- and long-term opportunities for adaptation, such as corridors for species' migration.

Map A.2. The Quonatauck CFA (100-year Floodplain)



U.S. Fish & Wildlife Service

Connecticut River and Major Tributaries

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: 4/22/2015



Goals, Objectives, and Strategies for Refuge Lands in the Quonatumuck 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 stopover habitat for migrating landbirds, nesting trees for osprey and bald eagle and early successional habitat for New England cottontail.

Rationale:

We envision healthy forests within the Quonatumuck CFA where a diverse seral structure provides suitable habitat conditions for a suite of 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 sub-objective assumes the forests of the Quonatumuck are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Foster et al. 1998; Foster 2000; Goodburn and Lorimer 1998; Cogbill 2002; Bellemare 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 that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and where appropriate, move succession forward to emulate later seral stage characteristics.

For many species, 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 Quonatumuck 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 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. The USFWS New England cottontail initiative has identified focus areas along the lower Connecticut River, where the decline in early successional habitats is a particular problem for the New England cottontail. New England cottontail is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut and Massachusetts.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of fifteen or more habitat patches, several of which are 25 acres or more. Each habitat patch being one mile or less from each other to aid in New England cottontail movement between patches (Fuller et al 2012). Early successional management within the Quonatumuck CFA will occur adjacent to existing acceptable habitat patches to benefit New England cottontail.

Migrating landbirds are typically unable to deposit sufficient fat stores to fly nonstop between breeding and nonbreeding areas (Blem 1980) and must use stopover habitats for feeding and resting before continuing migration. Studies have shown migrating birds exhibit selective use of some habitats over others (Petit 2000; Moore et al. 1990; Rodewald et al. 2004). In general, taller, more structurally diverse vegetation types within an area appear to support greater numbers of migrating birds than do habitats of lower stature and complexity (Noss 1991; Moore et al. 1990). Clearly, structurally complex habitats will not be suitable for all migratory species, but our conservation goal is to provide those areas used most frequently by migrating birds, suggesting relatively

tall, structurally diverse habitats may best serve this purpose. The plasticity in habitat use exhibited by most species during migration (Moore et al. 1990; Petit 2000) suggests that many species are able to effectively use the food resources and cover afforded by structurally complex habitats. Our management goals for hardwood forests in this division would be to provide a diversity of age classes supporting a variety of bird species with a range of foraging opportunities. Patches of mature edge-dominated and shrub-sapling stage forests were used most frequently by fall stopover migrants in a Pennsylvania study (Rodewald et al 2004).

In a mature forest, many migrating bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. In order to support the foraging needs of the greatest diversity of bird species, hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater 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 shrub-sapling habitat rich in fruits and insects important to migrating birds (Noss 1991; DeGraaf et al. 2006).

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater than 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 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 and osprey. 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, barred owls, and woodpeckers, like the northern flicker.

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 Habitat Management Plan (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.
- Work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. Plan to manage approximately 100 acres of shrubland habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a HMP is completed.
- Work with partners, including the states in support of the state wildlife action plans, 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.
- 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:

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

Sub-objective 1.1b. (Hardwood 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 stopover habitat for spring and fall migrants.

Rationale:

Occurrences of hardwood swamps within the Quonotuck Conservation Focus Area (CFA) represent a number of natural communities. Historically they have undergone significant alteration, and have great potential for restoration. Acidic hardwood swamps may be found in basins, or on gently sloping seepage lowlands within small patches where an acidic substrate of mineral soil, often with a component of organic muck, creates a shallow, perched water table. Eastern hemlock is often the dominant overstory species, and the organic substrate supports an important sphagnum (moss) layer.

Hardwood swamp occurrences within the Quonotuck CFA with more alkaline soils are often found along riparian and floodplain areas 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 water table drives complexes of forest upland and wetland species including pin oak, red maple, swamp white oak, sweetgum, and blackgum.

These two systems do share a common disturbance history; agricultural practices, development pressures, and selective logging have largely removed these habitats from the landscape, or greatly simplified their 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 the Quonotuck 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 forest habitats, natural levees, backwater sloughs, and oxbow lakes will create high-quality habitat for spring and fall migrant birds in a landscape where small, disturbed forest fragments are the rule. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites shown to be important during the energy-intensive migration (Petit 2000).

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:

- Work with partners, including the four state's wildlife agencies in support of their respective state wildlife action plan, to ensure management on Service lands complements adjacent land management objectives.
- Evaluate hydrologic regime to inform restoration efforts.
- 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

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve forest structure, species composition, and/or ecological function.
- 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, improve landscape connectivity to aid in climate change adaptation and provide habitat for migrating landbirds and migrating, breeding, and wintering waterfowl.

Rationale:

Shrub swamps and floodplain forests are often found within the floodplain of rivers and streams. Though, shrub swamps also occur in isolated pockets within poorly drained areas and small seepage zones that are not part of a floodplain system (Gawler 2008). Many shrub-dominated swamp communities are maintained through flooding, and will likely persist for centuries. Floodplain forests occur within the floodplains of major river systems, including the Connecticut River and many of its tributaries. These forests were a common occurrence until the middle of the 1800s, when floodplain communities were converted to agricultural use or urban areas. Floodplains are still valuable for agriculture today, and only fragments of floodplain forest remain within the watershed (Marks et al. 2011, Thompson and Sorenson 2000).

Shrub swamp and floodplain forest communities provide important habitat for migratory landbirds. A study of spring stopover habitat use by neotropical migrant birds within the Connecticut River Valley (<http://www.science.smith.edu/stopoverbirds/index.html>; accessed August 2013) conducted by Smith College through funding by the Service provides indications of the importance of the Connecticut River watershed to migrating birds. During a 3-year study (1996 to 1998), observers conducted 8,640 point count surveys and counted a total of 102,259 birds. The results demonstrated that spring migrant birds using the Eastern Flyway reach the southern portions of the Connecticut River watershed in large numbers, then disperse throughout the watershed and beyond as they continue north. Almost half (47%) of the birds counted within the defined count circles were at sites along the main stem of the Connecticut River. This trend was even more pronounced along the Connecticut and Massachusetts portions of the river and during the early periods of spring migration. Forested wetlands and shrub swamps are likely to be particularly valuable habitats along the main stem of the river because they provide more food and protection earlier in the spring migratory period due to warmer air and water temperatures and earlier tree leaf-out. Overall density of birds observed decreased by about half from south to north, as birds dispersed away from the main stem of the river as they moved north. The mouth and lower main stem of the Connecticut River may serve as a landscape feature used by many Eastern Flyway migrants to orient north after reaching the southern New England coast. The results of this study suggest that habitat protection within the Connecticut River watershed will have significant benefits for supporting neotropical migrants during the spring migratory period, especially forest and shrub wetlands along the main stem of the river.

The shrub swamp and floodplain forest communities along the Connecticut River also provide stopover and breeding habitat for migrating and breeding waterfowl. The Connecticut River is a waterfowl focus area for New Hampshire and Vermont under the Atlantic Coast Joint Venture, highlighting the importance of the river habitats to breeding and migrating waterfowl (ACJV 2005, NHFG 2006). Species such as Canada geese, teal, mergansers, American black ducks, mallards, wood duck, and some sea ducks use the river corridor during spring and fall migration. The river provides prime breeding habitat for American black duck, wood duck, mallard, common merganser, and Canada geese. The lower Connecticut River supports waterfowl year-round with some of the highest and most significant concentrations of American black duck, a priority refuge resource of concern species, in the Northeastern United States (Dreyer and Caplis 2001).

Floodplains are not only important to species of conservation concern, but also to provide resilience to climate change. Storms are predicted to become more frequent and capable of producing more coastal and inland flooding. These storms are, and can continue to, negatively impact habitats and human infrastructure. Intact and connected floodplain habitats will slow down and contain floodwaters decreasing damage to watershed ecosystems and human infrastructure. It is critical that these habitats are protected and restored throughout the watershed.

Due to our unfamiliarity with habitat conditions in the CFA, management of these wetland communities will first require 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 these wetlands 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.
- Work with partners to restore degraded habitats, particularly floodplain forests.
- Work with partners, including the four state's wildlife agencies in support of their state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives.
- Control invasive plant species following best management practices. Invasive plant priorities include:
 - ✓ Removing invasive Oriental bittersweet using a combination of pulling smaller plants, cutting larger stems, and treating with herbicides to protect valuable canopy trees and young floodplain forest trees.
 - ✓ Removing black locust using herbicides following best management practices (<http://mnfi.anr.msu.edu/invasive-species/BlackLocustBCP.pdf>) to protect floodplain forest.
 - ✓ Control Amur corktree and other new, small infestations of invasive plants able to withstand flooding.
- Work with local Conservation Commissions on preferred herbicide use measures and ensure our invasive plant control complies with state wetlands protection acts.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

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

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marsh communities to support natural and rare ecological communities, and provide breeding, wintering, and stopover habitat for waterfowl.

Rationale:

Freshwater marshes along the Connecticut River are often part of the floodplain community, though they also occur in isolated pockets within poorly drained areas and small seepage zones outside the floodplain system. These habitats provide important stopover and breeding habitat for waterfowl and waterbirds. The Connecticut River is a waterfowl focus area for New Hampshire and Vermont under the Atlantic Coast Joint Venture, highlighting the importance of the river habitats to breeding and migrating waterfowl (ACJV 2005, NHFG 2006). Species such as Canada geese, teal, mergansers, American black ducks, mallards, wood duck, and some sea ducks use the river corridor during spring and fall migration. The river provides prime breeding habitat for American black duck, wood duck, mallard, common merganser, and Canada geese. Freshwater marshes provide calorie-rich aquatic and emergent vegetation, and invertebrates for these waterfowl species. Rails, bitterns, egrets, and herons also use freshwater marsh habitats for breeding and stopover foraging opportunities. Shorebirds will use tidal mudflats of freshwater tidal wetlands for foraging in the southern portion of the watershed.

These communities are identified as having high ecological and functional importance within the state wildlife action plans. Also within these plans, a common concern exists for the health and proliferation of these habitats. Development, invasive species, contamination, altered hydrology, dredging, and sedimentation are a few of the threats that are damaging these ecosystems.

Due to our unfamiliarity with habitat conditions in the CFA, management of these wetland communities will first require 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 these wetlands 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.
- Use state best management practices within or adjacent to 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:

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

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

Where appropriate, restore pasture, hay, and grasslands to floodplain forest communities and provide a forested buffer along the Connecticut River. Also, if and where appropriate, maintain a contiguous block of grassland habitat for breeding and migrating grassland bird species.

Rationale:

These habitat types are primarily the result of agricultural production activities. Agricultural lands occupy roughly 8.5 to 12 percent of the watershed's landbase, of which one-half to one-third, approximately 229,000 acres, is prime agricultural land. Most of the quality agricultural lands are in the broad Connecticut River Valley (Clay et al. 2006) and often within the floodplain of the Connecticut River.

Floodplain forests occur along medium to large rivers, and include a matrix of upland and wetland habitats. Common habitats in floodplains are silver maple stands, 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 and 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 (Gawler 2008). 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.

Our conservation efforts within the Quonotuck CFA 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. Intact floodplain forests in the Quonotuck CFA will provide high-quality habitat for neotropical migratory birds in an otherwise agricultural landscape where small, disturbed forest fragments are the rule. Species such as wood thrush, veery, and black-throated green warbler with a preference for forest habitats during migration will benefit (McCann et al. 1993). Restoration of floodplain forest communities will restore forest connectivity, providing travel corridors for wildlife. Increased water quality will also result as erosion and siltation will decrease, and a restored canopy will provide shade for aquatic species.

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. Prior to European settlement, Native Americans also cleared and maintain some amount of grassland habitat. Naturally occurring grassland ecosystems were not uncommon in the eastern U.S., but, were often found closer to the coast rather than inland (Brennan et al. 2005). These grassland ecosystems have since been impacted by development and fragmentation.

The major river valleys and coastal areas likely contained most of the natural grasslands (Dettmers and Rosenberg 2000). Today, little historic natural grassland remains. Potentially suitable lands, such as pastures and hayfields, are increasingly being converted into residential developments. The highest quality habitats for grassland birds in the Watershed typically are in conservation areas or airports which delay mowing until the middle of July to allow the ground-nesting birds to fledge their young.

Some level of grassland conservation and, where appropriate, restoration, is warranted based on the historic evidence and the desirability of retaining grassland species (often state-listed) in each state. The Partners in Flight plan for the Southern New England Physiographic region set a broad level goal of protecting 25,000 to 38,000 acres of grassland, to produce 250 breeding pairs of upland sandpipers, 800 pairs of grasshopper sparrows, and 15,000 pairs of bobolinks. In Connecticut, Connecticut Audubon recommended a 5,000-acre network of natural grasslands in patches at least 500 acres in size, 3,500 acre late harvest working hayfields (greater than 25 acre blocks), and giving priority to currently existing grasslands (Comins et al. 2005).

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:

- 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.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, identify and implement habitat restoration opportunities within the Quonotuck CFA and Connecticut River to benefit priority refuge resources of concern including American shad, shortnose sturgeon, American eel, alewife, blueback herring, and Atlantic salmon.

Rationale:

The Connecticut River provides important habitat for American shad, shortnose sturgeon, American eel, alewife, and blueback herring. The major tributaries of the river also provide additional open water habitat for these species. There are also various brooks that feed into these rivers that are important for river herring, which require fast moving, shallow water for spawning. American shad, shortnose sturgeon (a federally listed species), American eel, and alewife spawn in slow moving waters of larger tributaries such as the Connecticut River. The Connecticut River is also important for migratory Atlantic salmon that spawn in cold water habitats further north.

Restoring and maintaining the ecological integrity of upland and wetland habitats of the CFA will have positive impacts on water quality of the Connecticut River, and other aquatic systems in the CFA. Baseline information on the condition of the water resources, and associated upland and wetland habitats in the CFA 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 maintain open channels from the Connecticut River to open water coves.
- Work with adjacent landowners to eliminate barriers to aquatic species passage.

Within 10 years of land acquisition and CCP approval:

- Work with partners to protect and increase “hard bottom” (e.g., gravel, cobble, or bedrock) for spawning aquatic species.
- Work with partners to reduce combined sewer overflow.

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

Sub-objective 1.4a. (Dunes and Maritime Grasslands)

Protect and manage dunes and maritime grassland habitats to support species of conservation concern and natural and rare ecological communities.

Rationale:

These habitats include the Atlantic coastal plain northern dune and maritime grassland, and heathland and grassland community types. These systems are restricted to the coast of Connecticut, and are therefore rare in the watershed. Coastal dunes and grasslands are generally small, in good to fair condition, and often located along Long Island Sound adjacent to low energy beaches (CT 2005). The grasses and shrubs that dominate are influenced by the maritime environment, including frequent salt spray, saltwater overwash, and sand movement (Gawler 2008).

The coastal plain heathland and grassland communities are related to dune grasslands but occur on sandplains, not dunes. These communities may occur as heathlands, grasslands, or support a patchwork of grass and shrub vegetation. Sandplain grasslands are one of the most impacted terrestrial habitats in Connecticut, and the condition of the habitat is considered poor (CT 2005). Coastal plain heathland and grassland community vegetation is maintained by fire, though in the absence of disturbance (fire, grazing, mowing), coverage by pitch pine and scrub oak can increase, creating vegetation similar to a pitch pine—scrub oak barren; or in some cases, a tall-shrub community can develop in the absence of fire (Gawler 2008).

These communities are fragile habitats that support priority species in need of protection from human development and disturbances. They protect salt marsh from storms and provide nesting and feeding habitat for piping plovers, least terns, and American oystercatchers. The most challenging issues facing dune habitat are recreational activities, oil spills, and rising sea level resulting from climate change (CT 2005).

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including state wildlife agencies, in support of state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives
- Work with partners to monitor and protect breeding populations of colonial and beach nesting birds such as piping plover and least terns.

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 1.4b. (Biological Integrity, 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:

Refuge managers are required to manage for the “biological integrity, diversity, and environmental health” (BIDEH) of the Refuge System pursuant to the National Wildlife Refuge System Improvement Act of 1997. This mandate is a cornerstone of Refuge System philosophy and management. The framework for fulfilling the mandate is provided in Refuge System Policy 601 FW 3, which calls for the maintenance of “historic conditions,” which are defined in policy as “composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human related

changes to the landscape.” 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).

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 slow moving streams and pools in wetland 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 & 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 Quonotuck 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 upland and wetland matrix, and providing additional structural and species diversity to the matrix. Rocky shorelines along large river systems, 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 a nutrient rich site for benthic organisms. One could make the case that these rocky shorelines 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 state wildlife agencies, in support of the state wildlife action plans, 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 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Sub-objective 1.5a. (Salt Marsh)

Protect and manage salt marsh habitats to support species of conservation concern, and natural and rare ecological communities.

Rationale:

The name Connecticut is the French corruption of the Algonquin word “quinetucket” meaning *long tidal river*. The second largest group of wetlands in the Watershed is estuarine wetlands or tidal wetlands which are located in the lower part of the main stem of the Connecticut River. Estuarine wetlands are influenced by both tidal and freshwater flows. The lower part of the Connecticut River is considered the most pristine large–river tidal marsh system in the Northeast (USFWS 1994). The wetlands at the mouth of the Connecticut River are intertidal marshes vegetated by grasses such as smooth cordgrass, saltmeadow cordgrass or hay grass, salt or spike grass, saltmeadow rush or black grass, and other salt–tolerant plants. Salt marshes are among the most productive ecosystems in the world.

Further upstream, the Connecticut River has extensive, high-quality freshwater and brackish tidal wetland systems which provide habitat for several federally listed species, species at risk and globally rare species, including wintering bald eagles, shortnose sturgeon, and Puritan tiger beetles. This area also provides significant American black duck habitat for breeding, wintering, and migration. It serves as an important movement corridor for migratory birds, especially waterfowl, rails, many species of neotropical migrants, and raptors. Within this group of wetlands, wild rice marshes are considered rare and valuable and function as significant resting and feeding areas for waterfowl, shorebirds, and especially the sora rail.

The lower Connecticut River tidal wetlands complex has been designated a “Wetland of International Importance” by the multi-national Convention on Wetlands of International Importance (aka Ramsar Convention). The Ramsar Project area contains 20,570 acres and consists of 20 discrete major wetland complexes (USFWS 1994). The Ramsar designation is used for wetland complexes that have international significance in terms of ecology, botany, zoology, limnology, or hydrology. The lower Connecticut River tidal wetlands complex is considered the best example of this type in the northeastern United States.

Tidal wetlands provide foraging habitat for a variety of shorebirds, including willet, various species of sandpipers, ruddy turnstone, red knot, and whimbrel. These wetlands also support migrating and wintering waterfowl, various marsh birds, sparrows, bald eagles, and osprey. Its tidal marshes and mudflats support significant concentrations of waterfowl and shorebirds, as well as nesting habitat for global significant species such as the salt marsh sharp-tailed sparrow (Atlantic Coast Joint Venture 2005). This habitat is also important as nursery areas for a variety of aquatic species.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including state wildlife agencies in support of the state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives.
- Identify and prioritize wetland restoration or enhancement projects that benefit species of conservation concern.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories particularly to determine the status, abundance, and distribution of priority resources of concern such as salt marsh sharp-tailed sparrows, and American black duck.
- Map natural communities; protect rare or exemplary examples.
- Identify and map estuarine habitats, particularly spawning and nursery habitats.

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 towards solutions; 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 Quonotuck Division as an outdoor classroom.

Rationale:

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 scientific research, environmental education, and fish and wildlife-oriented recreation and access.”

Management Strategies:

Within 1 year of acquiring sufficient land:

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

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Quonotuck 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 Quonotuck 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 Quonotuck 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:

Interpretation is an important tool that can be used to spread the refuge message to private residents and visitors to the refuge. With an ADA-compliant trail planned for the site, the Quonotuck 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 the Quonotuck Division’s habitats, wildlife, and cultural resources.

Management Strategies:

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 Quonotuck 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, print and social media, signs, and exhibits) when creating programming for natural and cultural resource interpretation.
- 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 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:

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Quonotuck 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., pamphlets, signs, etc.).

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 Quonotuck 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 Quonotuck 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:

Hunting is one of the six priority, wildlife-dependent recreational uses for the Refuge System. Hunting is generally allowed on national wildlife refuges, as long as it is found to be a compatible use. We would plan to open portions of the Quonotuck Division to hunting, assuming it is found compatible and we acquire sufficient land to support hunting. Allowing hunting opportunities at this unit conforms to historic use on the nearby state wildlife management areas. Allowing hunters to use public lands helps ensure this wildlife-dependent recreational activity continues and contribute to the states' population management objectives.

Management Strategies:

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

- Consult with state wildlife agencies to evaluate the suitability of new acquisitions to support a safe, manageable hunt programs.
- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours, 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 land sufficient land to support hunting seasons:

- Work with state wildlife agencies 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 state wildlife agencies to evaluate the effectiveness and success of a refuge hunt program in contributing to state population objectives.

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

Provide hunter education classes to access the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, Web site 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 hunt brochure(s) that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at Quonotuck Division kiosks, through a friends group, and in local businesses.

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

- Work with state wildlife agencies 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 Quonotuck Division after completing all administrative procedures to officially open refuge lands to fishing, based on state regulations and division-specific regulations, if necessary.

Rationale:

Fishing is one of the six priority, wildlife-dependent recreational uses for the Refuge System. The principal fishing resources on this CFA are the Connecticut River and its major tributaries. Our management would focus on providing river access to anglers, where compatible fishing opportunities exist.

Management Strategies:

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.

Within 5 years of acquiring land with fishable waters:

- Work with state wildlife agencies 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 and fishing is determined to be compatible, 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:

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 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. Opening acquired land in this new division to wildlife observation and photography will provide visitors a chance to see and photograph a variety of wildlife species in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset for wildlife observation and photography.
- 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 land:

- Develop a public access strategy and required planning (e.g., NEPA compliance and compatibility determinations) 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 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:

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 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 land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, boat access, 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 3.3c. (Watershed-based Partner Initiatives)

Develop compatible opportunities on Quonotuck Division that promote state and watershed-wide initiatives that facilitate wildlife observation and photography, such as the Connecticut River Birding Trail and state roadside wildlife viewing areas, and which 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:

Watershed-wide recreational trails and initiatives give individuals opportunities to view and photograph wildlife throughout the Connecticut River watershed. Examples include the Connecticut River Birding Trail, the Connecticut River Byway, the Connecticut River Paddler's Trail, and the newly designated Connecticut River Watershed Blueway. 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 partners to support and promote watershed-based wildlife observation and photography opportunities, such as the Connecticut River Birding Trail.
- Make guides and published materials supporting the Connecticut River Byway and the Connecticut River Watershed Blueway available at the visitor contact station.

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 Quonotuck 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 Birding Trail, the Connecticut River Byway, the Connecticut River Paddler's Trail, and the newly designated Connecticut River Watershed Blueway. 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 partners to support and promote regional water-based trail initiatives.
- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.

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

Not applicable

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 Quonotuck 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:

Within 1 year of acquiring land:

- Allow hiking, snowshoeing, and cross-country skiing in designated areas.
- Allow petwalking; pets must be on a leash no longer than 6 feet long and must be under the control of their owners/handlers to avoid posing a threat to other visitors, staff, or wildlife.
- 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.
- Consider providing boat access (e.g., trails to water; boat launches for motorized boats and canoes and kayaks).