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NRCS Action Plan to Conserve : Identified Priority Fish and Wildlife Species and Habitat in Maine

United State Department of Agriculture Natural Resources Conservation Service

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Prepared by:
Maine NRCS with assistance from the
State Technical Committee
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Approved:

State Conservationist for Maine
Natural Resources Conservation Service

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Date

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Table of Contents

List of Tables

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I. Background

The Chief's 2005 Action Plan for Fish, Wildlife and Wetlands calls for NRCS leadership at the national and state level to recognize and promote fish and wildlife conservation as an agency priority. Also identified was the need to ensure all NRCS programs use their authorities to address fish and wildlife concerns and to focus conservation efforts on habitats and species of greatest conservation need. A national NRCS oversight and evaluation report completed during 2004 for the Wildlife Habitat Incentives Program (WHIP) also states the need to focus conservation efforts to have any meaningful effect.

As a result of national and state leadership, special NRCS program and cost-share initiatives have been directed to promote conservation of high priority species and habitats (e.g., Pacific and Atlantic salmon-WHIP; sage grouse-WHIP; northern bobwhite quail habitat restoration-WHIP, Environmental Quality Incentives Program (EQIP); Bull and Cutthroat Trout initiative-EQIP). Recent Memoranda of Understanding have been signed at the national level with multiple partners (Restore America's Estuaries, the U.S. Fish and Wildlife Service, Quail Unlimited, Wild Turkey Federation, to name a few) to help deliver effective conservation for the Nation's fish and wildlife resources.

This action plan for Maine NRCS identifies conservation targets, major resource concerns for each conservation target, and discusses opportunities for NRCS programs to help alleviate or solve identified resource concerns. Note that the conservation targets chosen are not meant to be inclusive of all environmental issues endemic to Maine, but are a subset upon which NRCS programs can focus. This action plan is a dynamic document to be adapted to address changing or evolving conservation issues as identified by NRCS and its conservation partners.

In some cases identified fish and wildlife conservation targets and resource concerns may be addressed under the authorities of multiple NRCS programs or one program may be ideally suited to help solve a particular concern or suite of concerns. In addition to the Wetland Reserve Program (WRP) and WHIP, national guidance recommends the entire portfolio of NRCS delivered Farm Bill programs be used to benefit the nation's fish and wildlife resources.

II. National and Regional Fish and Wildlife Priorities

Projects that enhance habitat essential for the survival of federally protected species or those species that are candidates or proposed for listing under the Endangered Species Act have priority. The Endangered Species Act of 1973 (ESA), as amended, requires Federal agencies to use their programs to actively support the goals and objectives of the Act. NRCS National Policy states the Agency's intent to ensure conservation of federally protected species through implementation of its programs. Conservation of federally protected species and species in decline is an objective of the EQIP, Grassland Reserve Program (GRP), Healthy Forest Reserve Program (HFRP), WRP, and WHIP.

NRCS wishes to use its existing programs to contribute to National or Regional conservation initiatives. Initiatives that have well defined objectives and use a partnership approach to focus resources of state and federal agencies and national conservation organizations are emphasized. The North American Waterfowl Management Plan - Atlantic Coast Joint Venture, the National Bird Conservation Initiative - Partners in Flight (PIF), and the Gulf of Maine Council's (GOMC) Habitat Restoration Strategy have established regional management plans and identified strategies for Maine. The American Woodcock Conservation Initiative for the Atlantic Northern

Forest region is a new initiative that offers opportunities for existing NRCS conservation programs to conserve early successional forest species. The Eastern Brook Trout Joint Venture is a pilot program of the newly established National Fish Habitat Initiative. Objectives of these initiatives are recognized and supported by numerous conservation agencies and organizations.

Projects involving multiple partners are usually cost effective and more technically sound. Therefore, projects which involve the technical and financial resources of NRCS and other Federal partners and national conservation organizations to deliver effective and focused conservation will be favored.

III. State Fish and Wildlife Priorities

A Comprehensive Wildlife Conservation Strategy (CWCS) for Maine has been developed by the Maine Department of Inland Fisheries and Wildlife (MDIFW), Maine Department of Marine Resources (MDMR) and their partners (MDIFW 2005) to satisfy requirements of the State Wildlife Grant program. The CWCS provides a wealth of information on the abundance, distribution, current knowledge, conservation and priority status of Maine's fish and wildlife. NRCS strives to use its programs to assist in a coordinated effort to help implement Maine's CWCS within the context of NRCS national priorities, local priorities and program objectives and capabilities.

Growth management using information and guidelines for habitat protection provided by the *Beginning with Habitat Program*, administered by MDIFW in cooperation with state and federal agencies and several non-governmental organizations, is a very proactive approach to conservation. Another complementary approach is use of NRCS conservation programs to actively protect, enhance or restore habitat and/or to help resolve or minimize deleterious impacts to natural resources associated with particular land uses.

To further identify Maine fish and wildlife conservation issues that can be effectively addressed using NRCS programs, Local Work Groups at the county and statewide level were convened. Results from the State Technical Committee's Fish and Wildlife Subcommittee (STC-FWS) and county Local Work Group meetings were combined. Portions of The Nature Conservancy's (TNC) Five-S Framework for Site Conservation methodology (2000) was used to identify conservation targets for terrestrial and aquatic systems. Tables 1 and 2 list the aquatic and terrestrial based conservation targets identified. For NRCS' purposes, each conservation target is considered of equal rank. The methodology was also used to identify and rank key altered ecological attributes across systems and conservation targets and to identify and rank causes of ecological alteration. Necessary information for ranking that was not provided during workgroup meetings was provided by NRCS using best professional judgment and reference literature.

Key altered ecological attributes were ranked based on perceived severity and scope. *Severity* is considered the impact a particular ecological attribute has on the future viability of a conservation target. *Scope* is perceived as the extent to which alterations exist within the range of each conservation target. *Threats* are factors that contributed to alteration of ecological attributes. For the most part, only threats which can be in whole or in part resolved using NRCS programs and conservation practice standards were considered. Threats were ranked based on their perceived *contribution* to the alteration of key ecological attributes and their *reversibility*. Prioritized management actions based on these results are provided in Tables 3 – 8.

More detailed information concerning altered ecological attributes, threats, and threat rankings for systems and conservation targets are provided in Appendix A. A brief summary of results is provided below.

Table 1. Workgroup Recommendations for Aquatic Systems			
Systems:	**Rivers and Streams**	**Coastal Areas**	**Lakes and Ponds**
Conservation Targets:	Diadromous Fish	Salt Marsh and Associated Mudflats	Diadromous Fish
	Native Fresh Water Salmonids	Eelgrass	Arctic Char
	Swamp Darter	Beaches	Lake Whitefish
	Native Freshwater Mussels	-	Swamp Darter
	⇦ Designated Special Project Areas ⇨		

Table 2. Workgroup Recommendations for Terrestrial Systems (Includes Freshwater Wetlands)			
Systems:	***Pastureland, Hayland, Cropland & Old Field***	***Freshwater Wetlands***	***Forests***
Conservation Targets:	Upland Riparian Buffers	Emergent Marsh	Forest Condition
	Grassland Birds	Vernal Pools	Vernal Pools
	New England Cottontail Rabbit	Floodplain Forests	Upland Riparian Forest Buffers
	-	-	Floodplain Forests
	-	-	Deer Wintering Yards
	⇦ Designated Special Project Areas ⇨		

1. Rivers and Streams

Priority conservation targets are: **diadromous fish, native salmonids**, **native freshwater mollusks,** and **swamp darter**. Altered key ecological processes identified were barriers to fish passage, downstream transport of sediment and woody debris, altered stream channel, degraded water quality, and reduced population recruitment. Habitat fragmentation due to barriers to fish passage is the single greatest threat to targeted fish species. Altered downstream transport of sediments is the greatest threat to native mussels. Specific threats for the conservation targets identified for this system will be discussed below. Priority actions for rivers and streams are provided in Table 3.

1.1 Diadromous Fish and Native Salmonids

There are 11 diadromous fish species native to Maine. Five are listed as CWCS priority 1 species and two as priority 2. The Atlantic salmon, Atlantic sturgeon, shortnose sturgeon are protected by law and the American eel is currently a candidate for protection under the ESA. These two conservation targets are discussed together, due to threats being identical and threat ranks being nearly identical. For diadromous fish and native salmonids, man-made dams and stream crossings involving roads and bridges are the highest ranking threats. Inadequate riparian buffers are a high ranking threat. In stream irrigation water withdrawal and non-point source pollution involving nutrient, sediment and chemical inputs are considered a medium threat. Predation and inter-specific competition is considered a medium threat to diadromous fish species and a lower threat to native salmonids.

Removal of passage barriers will help alleviate many of the identified altered key ecological attributes. Man-made dams and hanging road culverts are the most frequently cited barriers to fish passage; however, in-stream obstructions and altered stream channel can also serve as barriers, particularly during low summer flows. In some cases, beaver dams may also serve as barriers to fish passage and may contribute to reduced flows; therefore, use of water leveler or beaver deceiver devices may be a viable management option. Fish passage and fluvial geo-morphological function can be enhanced by replacement of hanging culverts, removal of man-induced channel restrictions, and development of other in-stream habitat improvements. Establishment and maintenance of adequate riparian forest buffers and use of complementary NRCS conservation buffer practices (e.g., filter strips, windbreaks/shelterbelts, etc.) are recommended to improve water quality and to generate additional conservation dividends.

Reduced recruitment to diadromous fish populations due to predation and inter-specific competition for resources is an often cited threat in reference literature. An alternative currently under investigation is the use of pyrotechnic devices, e.g., “cannon” noisemakers, to reduce concentration of avian predators during diadromous fish runs. In some situations, fish passage alternatives can be designed to allow passage of priority fish species and to exclude undesirable species.

1.2 Swamp Darter and Native Freshwater Mollusks

The swamp darter is a CWCS priority 1 species and three species of mussels are considered either priority 1 or 2. For swamp darter and native mollusks, barriers to fish passage and altered downstream transport of sediment are the highest ranking altered ecological attributes,

respectively. Next in importance are altered stream channel, degraded water quality and reduced population recruitment.

The highest ranking threat to both swamp darter and native freshwater mussels relate primarily to deleterious effects of man-made dams, stream crossings and nearby roads. In addition to habitat fragmentation effects, dams, like some road and bridge crossings, increase sedimentation, alter hydrology, alter stream channels, and serve as a source of non-point pollution. Future or current development has the potential to reduce the integrity of existing riparian forest buffers or prevent restoration of riparian forest buffers. Reduced water quality may result due to increased water run-off and increased use of fertilizers, pesticides, and other chemicals that eventually may find their way into streams.

Table 3: Focused Conservation for Rivers and Streams	
Priority	**Conservation Targets and Priority Actions**
	Diadromous Fish and Native Salmonids
1	Remove barriers to fish passage
2	Establish adequate riparian forest buffers and other complementary buffering and/or planting practices along priority stream reaches
3	In-stream habitat improvements (e.g., improved water chemistry, restoration of full-bank width condition and fluvial processes, etc.)
4	Reduce predation; other needed habitat improvements
	Swamp Darter and Native Mollusks
1	Remove barriers to passage
2	Establish adequate riparian forest buffers and other complementary buffering and/or planting practices along priority stream reaches
3	In-stream habitat improvements (e.g., improved water chemistry, restoration of full-bank width condition and fluvial geomorphology, etc.)
4	Other needed habitat improvements

2. Coastal Habitats

Priority conservation targets are restoration of **salt marsh and mudflat**, **eelgrass** and **beach** habitat. Each of these targets will be discussed separately. A more thorough discussion of threats to coastal habitat is available in the *Gulf of Maine Habitat Restoration Strategy* (GOMC 2004). Priority actions for coastal habitats are provided in Table 4.

2.1 Salt Marsh and Associated Mudflats

Altered hydrology of salt marsh and associated mudflat is primarily due to tidal restriction, ditching, and fill. This habitat serves as primary habitat for bivalves and six CWCS priority 1 or 2 bird species, secondary habitat for 10 others including the regionally important American black duck, and provides important nursery habitat for many commercially important free swimming marine species. Tidal restriction and surrounding land use are the primary threats to water chemistry and water quality. Recommended practices should restore hydrology and native plant communities and reduce point and non-point sources of pollution. Invasive species control will also contribute to restoration of native plant communities.

2.2 Eelgrass

Past outbreaks of disease and disturbances to the seafloor from recreational watercraft and commercial fishing vessels have contributed to a 50% decline of eelgrass habitat. Loss of eelgrass beds may increase fragmentation of remaining eelgrass habitat. Degradation of water quality also has contributed to declines in eelgrass habitat. Primary restoration strategies are to transplant plants collected from donor sites, from plants grown from collected native seed, or direct seeding using collected native seed. Abatement of identified point and non-point sources of pollution will contribute to restoration efforts.

Table 4: Focused Conservation for Coastal Habitats	
Priority	**Conservation Targets and Priority Actions**
	Salt Marsh and Associated Mudflats
1	Restoration of hydrology to pre-altered conditions, as much as practicable
2	Install practices that reduce identified point and non-point sources of pollution (e.g., riparian forest buffer, herbaceous filter strip, critical area planting, etc.)
3	Invasive exotic plant control
4	Other needed habitat improvements
	Eelgrass
1	Restoration of eelgrass beds through seeding or planting
2	Install practices that reduce identified point and non-point sources of pollution (e.g., riparian forest buffer, herbaceous filter strip, critical area planting, etc.)
3	Install waste treatment practices where needed
4	Other needed habitat improvements
	Beaches
1	Use exclusion around important breeding and nesting sites to reduce disturbance during the breeding season
2	Planting of native beach vegetation to stabilize dunes and to restore native habitat
3	Invasive exotic plant control
4	Other needed habitat improvements

2.3 Beaches

Beaches provide important nesting habitat for wading birds, shorebirds, and mammals, including federally listed piping plovers, least terns, and marine turtles. The CWCS lists eight priority 1 or 2 bird species for this habitat. Altered native plant and animal communities, soil/sediment stability, and increased habitat fragmentation are the primary ecological attributes impacted. Reduced disturbance of essential nesting habitat, dune stabilization using native plant materials, and control of invasive exotic plants are priority management alternatives.

3. Lakes and Ponds

Priority conservation targets are **diadromous fish**, **arctic char**, **lake whitefish**, and **swamp darter**. Altered key ecological attributes for lakes and ponds include degraded water quality and reduced population recruitment. Habitat fragmentation due to barriers to passage is considered

the greatest overall limiting factor for diadromous fish and swamp darter. Alteration of native aquatic plant communities due to invasion of exotic aquatic plants (i.e., milfoils, hydrilla) is also an identified concern.

Considering the number of lakes and ponds in Maine, the key for delivering a well-coordinated and focused conservation effort will require identification of priority lakes and ponds for each of the priority species. Otherwise, efforts to conserve these species may not achieve optimal results. Priority actions for lakes and ponds are provided in Table 5.

3.1 Diadromous Fish

Dams preventing fish passage from or to stream habitat is considered the highest ranking threat. Pollution from road run-off and from land use, both residential and commercial, is a threat of medium rank. Providing fish passage and identifying and reducing sedimentation and pollution of priority lakes and ponds are priority management actions. Inadequate riparian buffers are ranked as a relatively low threat. However, establishment of riparian forest buffers and other conservation buffer practices in high use areas may reduce non-point sources of pollution. Predation and competition from introduced and non-native species of fish is a low ranking threat, mostly due to difficulties inherent in solving or reducing this threat.

3.2 Swamp Darter

The swamp darter has a restricted range in Maine, is a state threatened species located in the fastest developing area of the state, and is listed as a CWSC priority 1 species. Non-point source pollution due to nearby or encroaching residential or commercial land use is listed as the greatest threat to the swamp darter. Creation and maintenance of adequate riparian forest buffers and installation of other conservation practices to reduce non-point sources of pollution (e.g., nutrients, pesticide/herbicides, sediments, road run-off, etc.) are indicated as the best means to conserve this species. Removal of barriers to fish passage is also a priority where feasible. Control of predation due to introduced fish species is identified as a medium ranking threat.

3.3 Arctic Char and Lake Whitefish

Altered key ecological attributes and associated threats for arctic char and lake whitefish are identical. Although arctic char are rare and limited in range, populations in Maine seem to be stable but are vulnerable to changes in water quality and fish introductions (Frost 2001). There is reason to believe that lake whitefish populations, also limited in range, are in decline in some lakes (Basley 2001). Both species have a CWCS priority 1 ranking. Pollution in various forms from adjacent land use, inadequate or degrading riparian forest buffers, and predation and competition for available resources due to introduced fish species are threats. With the exception of fish passage issues, threats and priority actions are the same as for the swamp darter.

4. Pastureland, Hayland, Cropland & Old Field

Priority conservation targets are **New England cottontail rabbit**, **grassland birds,** and **upland riparian buffers**. These three conservation targets have relatively few overlapping key altered ecological attributes; therefore, they are discussed separately. Priority actions for agricultural land are provided in Table 6.

Table 5: Focused Conservation for Lake and Ponds	
Priority	**Conservation Targets and Priority Actions**
	Diadromous Fish
1	Remove barriers to fish passage
2	Establishment of adequate riparian forest buffers
3	Install other conservation practices that reduce identified point and non-point sources of pollution affecting priority lakes and ponds (e.g., filter strip, critical area planting, integrated pest management, waste treatment practices, etc.)
4	Install physical barriers to undesirable introduced fish species; other needed habitat improvements
	Swamp Darter
1	Establishment of adequate riparian forest buffers
2	Install other conservation practices that reduce identified point and non-point sources of pollution affecting priority lakes and ponds (e.g., filter strip, critical area planting, integrated pest management, waste treatment practices, etc.)
3	Remove barriers to fish passage
4	Install physical barriers to undesirable introduced fish species; other needed habitat improvements
	Arctic Char and Lake Whitefish
1	Establishment of adequate riparian forest buffers
2	Install other conservation practices that reduce identified point and non-point sources of pollution affecting priority lakes and ponds (e.g., filter strip, critical area planting, integrated pest management, waste treatment practices, etc.)
3	Install physical barriers to undesirable introduced fish species
4	Other needed habitat improvements

4.1 New England Cottontail Rabbit

The New England Cottontail (NEC) has an extremely limited and shrinking range. The NEC is a CWCS priority 1 species and a candidate for listing under both Maine and Federal law. Other high priority species such as the black racer will also benefit from management for the NEC. High ranking altered ecological attributes include increased habitat fragmentation and loss of suitable early successional native forest and old field habitat. Forest succession and invasion of exotic species are responsible for degradation of both early successional habitat and old field habitat. Loss of habitat has been attributed to conversion of agricultural land to commercial or residential development. Excessive mortality due to predation and road-kill is also indicated as high ranking threat. Intensive agriculture production practices are listed as medium ranking threats.

Adequate amounts of early successional habitat distributed within a landscape context would probably reduce mortality factors and allow for expansion of extant populations. In areas occupied by the NEC or areas proximal to occupied habitat, regular disturbance to setback forest succession to suitable habitat is required. Control of invasive exotic plants is also a recommended management action even though NEC is known to use brushy areas dominated by exotic honeysuckle species. Construction of properly designed and distributed brush piles may provide important protective cover.

4.2 Grassland Birds

Grassland bird populations have exhibited significant declines during the 20th century on national, regional and local scales. The CWCS (2005) lists seven species of grassland birds as occurring in Maine. The American pipit and grasshopper sparrow are listed by the state as endangered and the eastern meadowlark and vesper sparrow are state species of special concern. PIF regional plans covering Maine recognize bobolink, sedge wren and upland sandpiper as indicator species for grassland habitat.

Degradation of existing nesting habitat, loss of open agricultural land, low nesting success, and increased fragmentation of habitat are key altered ecological processes. Most of the identified threats involved loss of grassland habitat from conversion to other land uses (i.e., forestland, residential or commercial development). Additional threats are habitat degradation due to intensive management for forage and hay production and invasion of exotic plant species.

Developing, enhancing and maintaining habitat suitable for grassland species is crucial. To maintain suitable habitat conditions, priority actions include: widening of field borders, controlling invasion of brush and exotic species, maintaining suitable herbaceous vegetation by prescribed grazing, raising mower heights, rotational mowing, and deferring mowing until after the nesting period or, at least, the prime nesting period.

4.3 Upland Riparian Buffers

Economic pressure to maximize crop, forage and hay production can result in removal of riparian areas or riparian areas that do not protect water quality or provide suitable habitat for wildlife. Riparian areas also serve as wildlife travel corridors that connect habitat within fragmented landscapes. Key altered ecological attributes for this landscape level resource are habitat fragmentation, altered native plant communities, increased soil disturbance, erosion and deposition. The greatest identified contributing threat is invasion by exotic plants. Loss of riparian areas to agriculture and habitat disturbance, human or animal induced, are medium ranking threats. Damage from ice rafting is considered a low ranking threat.

5. Freshwater Wetlands

Priority conservation targets are **emergent marsh**, **vernal pools**, and **floodplain forest**. Common altered key ecological attributes are altered hydrology, altered native plant and animal communities, degraded water quality and loss of connectivity to adjacent upland forests. Roads, insufficient riparian buffers and intensive forestry practices potentially affect all altered ecological processes identified for the three conservation targets. Priority actions for freshwater wetlands are provided in Table 7.

5.1 Emergent Marsh

Emergent wetland comprises less than 5% of the available freshwater wetlands in Maine. This wetland complex provides primary habitat and secondary habitat for an extensive number of species across a number of different taxonomic groups. A total of 28 CWCS priority 1 or 2 species are listed for this habitat. Twelve use emergent marsh as their primary habitat and 16 use it as secondary habitat. PIF regional plans covering Maine recognize the American black duck as a priority indicator species for this system. Altered hydrology, degraded water quality and altered native plant communities are considered highest ranking altered ecological processes.

Table 6: Focused Conservation for Agricultural Lands	
Priority	**Conservation Targets and Priority Actions**
	New England Cottontail (NEC)
1	Restore/reclaim suitable early successional forest
2	Control invasive exotic plants or *establish* field borders or herbaceous cover bordering early successional forest and manage these areas for NEC
3	Actively manage *existing* herbaceous cover or early successional forest (e.g., timber stand improvement, rotational mowing, deferred mowing, feathering of forest/field edges, prescribed grazing, brush piles)
4	Other needed habitat improvements
	Grassland Birds
1	Actively manage entire fields primarily for the conservation of grassland wildlife (e.g., defer haying/mowing until after the nesting, exclude grazing, rotational mowing, strip-disking)
2	On agricultural fields (i.e., crop, hay or pasture land) create or widen herbaceous field borders or filter strips to at least 35 feet wide and defer management in these areas until after nesting
3	On pasture and hay land control invasion of brush and exotic species and enhance early succession habitat (e.g., rotational mowing, strip-disking, prescribed grazing, defer haying/mowing until after July 1st)
4	Other needed habitat improvements
	Upland Riparian Buffers
1	Create riparian buffers or widen existing riparian buffers to meet or exceed NRCS quality criteria for fish and wildlife
2	Control invasion of exotic plants or otherwise enhance habitat quality
3	Control erosion directly impacting valuable wildlife and fish habitat through use exclusion, critical area planting and bioengineered stream or shoreline stabilization techniques
4	Other needed habitat improvements

Roads, including forest access roads, lack of adequate riparian buffers, intensive forestry management, and invasive species are high ranking threats. Nutrient and chemical inputs, disturbance from humans and livestock, loss of dams (natural or man-made) needed for maintenance of emergent wetlands, and excessive road-kill mortality due to road proximity are medium threats.

Necessary management include: development or widening of riparian buffers to proper functioning condition and to provide habitat connectivity, controlling invasive exotic species, relocation of forest roads negatively impacting wetlands with restoration of native habitat on the previous road site, hydrologic restoration, reducing road-kill by providing wildlife passage roads or preventing wildlife access to roads, maintenance of desired water levels, and minimizing human and livestock access to wetlands. The decision to use water control structures to maintain emergent wetlands identified by the State of Maine as Essential or Significant Wildlife Habitat will consider impacts to other priority fish and wildlife species.

5.2 Vernal Pools

Vernal pool habitat is especially important for Maine's amphibian species and is protected by state statute as a Significant Wildlife Habitat. Altered ecological attributes are the same as for emergent marsh, although relative importance of the attributes vary somewhat. The highest ranking altered ecological attribute pertains to impacts on animal communities. Vernal pool dependent species are extremely sensitive to disturbance and alterations in environmental quality; therefore, alterations to any of the important ecological attributes may contribute to increased animal mortality and reduced reproductive success.

Practices which provide protection against chemical, nutrient or sediment inputs (e.g., filter strip, riparian forest buffer, hedgerow or windbreak/shelterbelt, etc.) are preferred management actions. Control or eradication of invasive exotic plants is also indicated using low impact removal techniques. Other desirable actions include: hydrologic restoration, enhancing connectivity to adjacent upland forest, and relocation of poorly placed forest roads with restoration of native habitat on the previous road site.

Considering the ephemeral nature of vernal pools, habitat identification is problematic. Currently vernal pool habitat has not been thoroughly inventoried and mapped, but the State of Maine is in the process of doing so. Future distribution of inventory results will greatly facilitate effective conservation of this resource.

5.3 Floodplain Forests

Floodplain forests share most of the same altered ecological attributes as other conservation targets identified for freshwater wetland systems. Alterations to hydrology and native plant communities are considered most important for this conservation target. Soil erosion, soil deposition, loss of connectivity to upland forest, and degraded water quality are of medium rank. Further loss of floodplain forest habitat is lower ranked.

Although the existence of man-made dams is the highest ranking threat, removal of dams for restoration of floodplain forest may not have the requisite appeal or statutory protections to support dam removal solely for floodplain forest restoration. More feasible would be restoration of floodplain forest legally drained to accommodate other land uses, establishment of conservation buffer practices on adjacent land uses, control of invasive exotic species, and limiting disturbance using low impact forest management and use exclusion practices.

6. Forest

Maine is the most heavily forested state in the Union with forestland comprising approximately 90% of the state. As one might expect, a large number of Maine's vertebrate and invertebrate wildlife, including fish, are dependent on forest ecosystems. Priority conservation targets are **forest diversity and condition**, **upland forest riparian buffers, deer wintering yards, vernal pools**, and **floodplain forests**. Vernal pools and floodplain forest are discussed above under Fresh Water Wetlands. High ranking altered key ecological attributes identified for forest include a less diverse forest mosaic, increased habitat fragmentation, and altered native plant communities. Increased soil erosion and deposition and reduced availability of snags and cavity trees are altered ecological attributes of medium concern. Priority actions for forest habitat are provided in Table 8.

Table 7: Focused Conservation for Freshwater Wetlands	
Priority	**Conservation Targets and Priority Actions**
	Emergent Freshwater Marsh
1	Restore natural hydrology or maintain desired water levels on wetlands designated as Essential or Significant Wildlife Habitat by the State of Maine
2	Control or eradicate invasive plants species, restore/expand riparian buffers and/or other conservation buffer practice on adjacent lands, relocate forest roads adversely affecting wetlands with restoration of native habitat on the previous road site
3	Minimize disturbance from humans and livestock, develop underpasses or barriers to minimize road-related animal mortality
4	Other needed habitat improvements
	Vernal Pools
1	Restore/expand riparian buffers, establish conservation buffer practices on adjacent land uses, and/or enhance habitat connectivity
2	Relocate forest roads adversely affecting wetlands with restoration of native habitat on the previous road site
3	Control of invasive plant species, exclude human and livestock access to vernal pool habitat
4	Other needed habitat improvements
	Floodplain Forests
1	Restore floodplain forest habitat
2	Establish conservation buffer practices on adjacent land uses to protect floodplain habitat and to provide habitat connectivity
3	Control of invasive plant species, exclude humans and livestock access to floodplain forest
4	Other needed habitat improvements

6.1 Forest Condition

High ranking threats include effects from use of intensive forestry production practices, creation or presence of forest roads, and conversion of forestland to other uses. Medium ranking threats include invasion by exotic species and increased soil erosion and deposition associated with stream crossings. Affecting all identified altered ecological attributes are intensive forestry management practices. Commercial timber management and production is considered by some to be the most pervasive human influence on forest systems. Although forest roads and stream crossings are listed as separate threats, many roads and stream crossings are associated with commercial timber management and harvest.

Some species are very sensitive to fragmentation effects (e.g., road development, small forest stand size) and homogenous habitat conditions. This is a landscape scale issue that to a limited degree can be addressed through application of NRCS' conservation planning process and, where applicable, NRCS conservation programs.

NRCS Farm Bill cost-share assistance opportunities for terrestrial wildlife on forestland have traditionally been restricted to management to set back forest succession to an earlier seral stage. PIF regional plans recommend the American woodcock and chestnut-sided warbler as indicator species for early successional forest habitat in southern Maine (i.e., low mountains and rolling hills associated with the Androscoggin and Kennebec river valleys). For the rest of Maine, PIF recommends the American woodcock, olive-sided flycatcher, Nashville warbler, ruffed grouse and chestnut-sided warbler as indicator species.

The Wildlife Management Institute has initiated an American Woodcock Conservation Initiative for the Atlantic Northern Forest Region of which Maine is part. NRCS programs can contribute to development of Best Management Practice (BMP) demonstration areas and facilitate implementation of BMPs on private land. Recommended management activities include strip- and patch-cuts to rehabilitate and maintain early successional forest and creation and maintenance of forest openings near feeding and roosting cover.

Other forest-related conservation opportunities may include pre- or non-commercial thinning treatments to enhance mid-story, under-story and ground-story development, control of invasive exotic plants, use of nest boxes or creation of snags for cavity dependent wildlife, and establishment of forested corridors. Where forest roads are impacting water quality, hydrology, and/or aquatic organism passage, critical area planting, bioengineered streambank or shoreline stabilization, providing aquatic organism passage, road relocation, and re-habilitation of retired roads may be needed. With sufficient funding, the Healthy Forest Reserve Program provides a new, non-traditional approach to management of forest ecosystems for wildlife.

6.2 Riparian Forest Buffers

As previously discussed, riparian buffers are exceptionally important to both terrestrial- and aquatic-based wildlife. Degradation or absence of properly functioning riparian forest buffers is identified as either an altered ecological attribute or as a threat for a large number of systems and conservation targets identified by this action plan. This underscores the importance of maintaining adequate riparian buffers or restoring riparian areas so they provide ecological services on a landscape level. Highest ranking among identified threats is intensive forest production practices. Invasive species, roads and road development, loss of riparian area to other land uses are high ranking threats. Soil disturbance due to human and livestock use of riparian areas is a medium threat.

Maine Inland Fisheries and Wildlife *Beginning with Habitat Program* recommend minimum forest buffers of 250 feet wide. Maine Shoreline Zoning law requires 75 foot buffers around second order and larger streams and 250 foot buffers around lakes, ponds and non-forested wetlands larger than 10 acres. Maine Forest Service best management practices are primarily designed to protect water quality and do not recommend a minimum size, but recommend site specific conditions to determine effective width.

NRCS can use its programs to advocate the conservation, restoration and enhancement of riparian buffers. Restoring or widening of riparian buffers can be accomplished through planting of native species and by natural regeneration. Enhancements can be accomplished by controlling invasive exotic plants, minimizing human, livestock, and other causes of soil disturbance, and by use of low intensity, low impact forest management and harvest techniques.

Table 8: Focused Conservation for Forests	
Priority	**Conservation Targets and Priority Actions**
	Forest Condition
1	Establish, rehabilitate and otherwise enhance early successional forest conditions to benefit American woodcock and other identified indicator species
2	Control invasive exotic species
3	Relocate forest roads adversely affecting aquatic resources with restoration of native habitat on the previous road site
4	Enhance availability of snags and cavity nesting habitat; other needed habitat improvements
	Upland Riparian Forest Buffers
1	Create riparian buffers or widen existing riparian buffers to meet or exceed NRCS quality criteria for fish and wildlife
2	Control invasion of exotic plants or otherwise enhance habitat quality
3	Control erosion directly impacting valuable wildlife and fish habitat through use exclusion, critical area planting and bioengineered stream or shoreline stabilization techniques
4	Other needed habitat improvements
	Deer Wintering Yards
1	Use forest stand improvement to enhance within-stand conditions and to perpetuate retention of functioning and high value deer wintering yard habitat
2	Control of pest infestations, where practicable
3	Control invasive exotic plants
4	Other needed habitat improvements
	Vernal Pools
1	Restore/expand riparian buffers, establish conservation buffer practices on adjacent land uses, and/or enhance habitat connectivity
2	Relocate forest roads adversely affecting wetlands with restoration of native habitat on the previous road site
3	Control of invasive plant species, exclude human and livestock access to vernal pool habitat
4	Other needed habitat improvements
	Floodplain Forests
1	Restore floodplain forest habitat
2	Establish conservation buffer practices on adjacent land uses to protect floodplain habitat and to provide habitat connectivity
3	Control of invasive plant species, exclude humans and livestock access to floodplain forest
4	Other needed habitat improvements

6.3 Deer Wintering Yards

Altered ecological attributes for this conservation target include habitat fragmentation, loss of suitable habitat, and altered native plant communities. Reasons for habitat degradation in descending order of importance are: intensive production forestry practices, conversion to other land uses, pest infestations, and invasion of exotic species.

Forest stand improvement through group selection is the priority management alternative to develop and maintain a forest stand structure that provides adequate winter cover, stand regeneration and an adequate source of browse. Control of pest infestations and/or invasive exotics species within a stand is warranted where practicable. Conversion of deer wintering yards to other land uses and further fragmentation of these areas with roads should be avoided.

6.4 Vernal Pools (discussed under section 5.2 above)

6.5 Floodplain Forests (discussed under section 5.3 above)

IV. Local Fish and Wildlife Priorities:

The USDA Local Work Group is responsible for identifying local fish and wildlife priorities. Local Work Groups consist of an NRCS designated conservationist and can include members of the Conservation District Board and the County Farm Service Agency (FSA) Committee, an FSA representative, other state or local elected or appointed officials, and other Federal, State or Tribal government representatives. The USDA Local Work Group can receive input from local interests regarding fish and wildlife conservation. Local priorities should complement National and State priorities where possible; however, local priorities may be additional to National and State priorities.

As previously discussed under Section III, input from Local Work Groups representing specific counties or multiple counties was sought during development of this plan. Input was received from the Cumberland County USDA Local Work Group, the Southwestern Maine Conservation Alliance representing Oxford, Androscoggin Valley, Cumberland and York Counties, and Somerset and Aroostook County USDA Local Work Groups. Local Work Groups added nuisance beaver management and excessive road-kill mortality to the threat analysis for diadromous species/native salmonids and emergent wetland sections, respectively.

V. Designated Special Project Areas

NRCS and its conservation partners should continue to identify where priority conservation problems or opportunities exist. Further prioritization of specific areas of concern is needed to identify which species or habitats warrant immediate attention of NRCS conservation programs.

MNAP and MDIFW mapped focus areas identify areas exhibiting concentrations of known rare animal and plant habitats and exemplary natural communities that merit special consideration for NRCS program funds. Currently, applicants within or bordering *Beginning with Habitat Program* designated Focus Areas receive additional environmental points during ranking of applicants submitted for the WHIP, EQIP and GRP.

Additional areas meriting special consideration can be identified at the state and/or local levels. Requirements for special project area designation for targeted delivery of NRCS conservation

programs are: consensus of need, a well-defined geographic area, and local and multi-agency interest to resolve identified resource concerns.

VI. Farm Bill Program Opportunities

Fish and wildlife achieved co-equal status with other resource concerns (e.g., soil, water, air, etc.) with authorization of the 1996 Farm Bill. Co-equal status was re-affirmed during re-authorization of the Farm Bill during 2002. Therefore, Farm Bill programs are expected to use their authorities to address fish and wildlife resource concerns. The amount of agricultural land currently under cultivation in Maine is declining, so non-traditional resource conservation issues, such as those involving fish and wildlife, are opportunities deserving of attention and currently are under-exploited. To maximize fish and wildlife conservation opportunities using the full complement of NRCS administered Farm Bill programs, it is imperative that aggressive outreach concerning program opportunities is conducted by NRCS and conservation partners.

1. Farm Bill Cost-Share Assistance Programs

1.1. Environmental Quality Incentives Program (EQIP), administered by NRCS

Nationally EQIP has the greatest potential of all NRCS programs to address fish and wildlife resource needs on working agricultural land. One of four national priorities identified in the 2002 EQIP rule is conservation of at-risk species. Any of the priority targets and associated issues identified in this action plan can be addressed on agricultural land. Fish and wildlife habitat enhancement can be a primary or secondary objective of applicants to this program. Particularly suited to Maine are projects that support conservation of grassland birds, New England cottontail and projects that minimize agricultural impairment of water quality and quantity.

1.2 Wildlife Habitat Incentives Program (WHIP), administered by NRCS

The WHIP can provide cost-share incentives to enhance habitat for fish and wildlife on both non-agricultural and agricultural land. Fish and wildlife habitat enhancement has to clearly be the primary management objective. Conservation of declining species and habitats is emphasized. At the time of this report, competition for available WHIP funds is low.

1.3 Conservation Reserve Program (CRP), administered by the USDA-Farm Service Agency

The CRP encourages farmers to retire and convert highly erodible cropland or other environmentally sensitive land to vegetative cover to improve water quality, control soil erosion and to enhance wildlife habitat. Farmers receive an annual rental payment for their retired cropland and cost sharing to establish and maintain vegetative cover. In Maine, the CRP has been most active in Aroostook County where retired cropland has been converted to grass cover and riparian forest cover has been established. The Maine program has contributed to conservation of grassland birds.

2. NRCS Easement Programs

2.1 Wetlands Reserve Program (WRP)

This program offers permanent and 30-year easement options as well as 10-year restoration cost-sharing agreements to restore and enhance functions and values of wetlands that have been degraded or drained for agricultural purposes prior to December 23, 1985. The foremost objective of the WRP is to restore wetland ecosystems to enhance habitat for migratory birds, wetland wildlife and threatened and endangered species. Secondary objectives include improved water quality, attenuation of flooding, groundwater recharge, and other benefits derived from properly functioning wetland systems. At the time of this report, the WRP is under utilized in Maine.

2.2 Grassland Reserve Program (GRP)

The GRP offers permanent and 30-year easements or 10-, 15-, 20-, or 30-year rental agreements. The primary program focus is to preserve grazed native grassland, pastureland and shrubland that are under threat of conversion to other land uses. Maintaining and improving plant and animal biodiversity on actively grazed land is a program emphasis. Enrolled land will require periodic manipulation to maximize wildlife habitat and preserve grassland functions and values. Protection of grassland bird breeding habitat is mandated. This program has the potential to contribute toward conservation and preservation of shrubland wildlife associated with reverting agricultural land such as the New England cottontail.

2.3 Healthy Forests Reserve Program (HFRP)

There are three options offered under HFRP: a 10-year cost-share agreement, a 30-year easement or an easement of not more than 99 years. The three objectives of this program are to restore and enhance forest ecosystems to promote recovery of threatened and endangered species, improve biodiversity, and to enhance carbon sequestration. Safe harbor agreements or safe harbor-like assurances will be offered to landowners who agree to restore or improve forestland to recover federally protected species. Private forest landowners, including private industrial forest landowners, are eligible for the HFRP. In Maine, the program's broad eligibility requirements and versatility provides an opportunity to work with non-traditional clientele to conserve forest wildlife that serve as an ecological indicator of forest health and as umbrella species (i.e., Canada lynx and American pine marten) for other forest dependent wildlife.

2.4 Farm and Ranch Lands Protection Program (FRPP)

The FRLPP provides matching funds to State, Tribal, or local farmland protection programs to purchase conservation easements from privately owned farms. The function of this program is to preserve land that contains prime or unique soil, historical or archaeological resources. The FRLPP ranking process is required to give priority to parcels that provide special social, economic and environmental benefits to an area. In the areas of the state under extreme development pressure, (e.g., south, coastal, and central), this program provides an opportunity to maintain open space and habitat important to many wildlife species.

3. NRCS Grant Opportunities

3.1 Conservation Innovation Grants (CIG)

CIG are funded under authority of the EQIP, is an attractive alternative for agricultural producers that allows greater flexibility and use of innovative approaches to treat pressing environmental concerns and to ensure compliance with Federal, State and local regulations. Although wildlife habitat is currently not a targeted natural resource concern for the Nationally offered CIG , fish and wildlife may be secondary beneficiaries of actions to improve soil, water and atmospheric resources and health of grazing lands and forest. At the discretion of State Conservationists, CIG offered by individual States can have a wildlife habitat resource concern component. Maine NRCS has included a wildlife component for CIG.

3.2 Cooperative Conservation Partnership Initiative (CCPI)

The CCPI is a voluntary program established to foster conservation partnerships that focus technical and financial resources on conservation priorities in watersheds and air sheds of special significance. The CCPI is established to encourage the formation of partnerships to devise and implement watershed or regional solutions to pressing natural resource priorities associated with agriculture and rural settings. Under CCPI, funds are awarded to State and local governments and agencies, Indian Tribes, and non-governmental organizations that have a history of working with agricultural producers.

3.3 Grants Awarded by NRCS' Agricultural Wildlife Conservation Center

Periodically, the Agricultural Wildlife Conservation Center is allocated conservation technical assistance funds to be awarded as grants for the purpose of implementing and/or evaluating the effects of NRCS conservation practice standards and programs on fish and wildlife resources or for development of innovative technologies.

VII. Applicant Ranking and Evaluation

Most NRCS programs require an evaluation process to prioritize proposed projects to maximize environmental benefits accrued from program delivery. As previously stated, national oversight and evaluation reviews for WHIP and EQIP have recommended screening and/or ranking processes that facilitate achievement of clearly defined national, regional, state and local priorities and cost-effective program delivery. The ranking process for the WHIP which is based on recommendations of this action plan can be located at Maine NRCS' WHIP website (Appendix C.). NRCS will continue to work with national, regional, state and local entities to refine program ranking and evaluation processes for all natural resources, including fish and wildlife.

VIII. Criteria for Measuring Success

NRCS employs periodic national program reviews, annual state program reviews, and annual conservation planning quality assurance reviews to ensure programs and conservation technical assistance are achieving their intended purpose. In addition, well designed program ranking tools can be used to track whether program outreach is effectively attracting high value conservation projects.

Although environmental monitoring of individual projects is desirable, NRCS does not have staffing to support such an effort. Therefore, NRCS must rely on established long term monitoring efforts (e.g., breeding bird counts, waterfowl surveys, etc.) or on the efforts of partners and volunteers to document whether program implementation is benefiting intended targets. It is essential that selected projects, especially those involving state and/or federally listed species and restoration of natural communities, be monitored to evaluate success and to enable adaptive management. NRCS and its conservation partners will strive to develop specific monitoring protocols and to explore whether non-Farm Bill programs and/or Farm Bill program financial and technical assistance money can be used to selectively monitor priority projects.

IX. Partner Involvement

NRCS will continue to work with a variety of conservation partners to effectively deliver USDA conservation programs to benefit fish and wildlife resources and to focuses efforts on priority national, regional, state and local fish and wildlife issues. Conservation partners who assisted NRCS with development of this action plan and who will continue to help NRCS to deliver conservation through USDA program are provided in Appendix B. Letters received endorsing the objectives of this action plan are also exhibited under Appendix B.

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APPENDIX A: Stress Matrices for Conservation Targets

1. Stress Matrix: NRCS Fish and Wildlife Action Plan for Rivers and Streams

1.1 Diadromous Fish

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Fair	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Habitat fragmentation (barriers to fish passage)	Very High	Very High	Very High
2	Altered stream channel	High	High	High
3	Degraded water quality	High	Medium	Medium
4	Altered hydrology	High	Medium	Medium
5	Altered downstream transport (sediment and woody debris)	High	High	High
6	Reduced recruitment	Very High	High	High

1.1 Diadromous Fish

Threats - Sources of Stress	Habitat fragmentation (barriers to fish passage)	Altered stream channel	Degraded water quality	Altered hydrology	Altered downstream transport (sediment and woody debris)	Reduced recruitment
Stress Rank	*Very High*	*High*	*Medium*	*Medium*	*High*	*High*

1. Dams (active or abandoned) — Threat to Target Rank: Very High

Contribution	Very High	Very High	High	Very High	High	Very High
Reversibility	Medium	Medium	Medium	Medium	Medium	Medium
Threat Rank	Very High	High	Low	Medium	Medium	High

2. Stream crossings (bridges, roads) — Threat to Target Rank: Very High

Contribution	High	Very High	High	Low	High	High
Reversibility	High	High	Medium	High	Medium	High
Threat Rank	Very High	High	Low	Low	Medium	High

3. Irrigation water withdrawal — Threat to Target Rank: Medium

Contribution	Low	Low	High	Very High		Low
Reversibility	Medium	Low	Medium	Medium		Medium
Threat Rank	Medium	Low	Low	Medium	-	Low

1.1 Diadromous Fish

Threats - Sources of Stress	Habitat fragmentation (barriers to fish passage)	Altered stream channel	Degraded water quality	Altered hydrology	Altered downstream transport (sediment and woody debris)	Reduced recruitment
Stress Rank	*Very High*	*High*	*Medium*	*Medium*	*High*	*High*

4. Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) Threat to Target Rank: Medium

Contribution			Very High		High	Medium
Reversibility			High		Medium	High
Threat Rank	-	-	Medium	-	Medium	Medium

5. Inadequate riparian buffers Threat to Target Rank: High

Contribution		Low	Very High		Very High	Medium
Reversibility		Medium	Medium		Medium	Medium
Threat Rank (override)						
Threat Rank	-	Low	Medium	-	High	Medium

6. Predation and interspecific competition for resources Threat to Target Rank: Medium

Contribution					-	High
Reversibility					-	Low
Threat Rank	-	-	-	-	-	Medium

1.2 Native Salmonids

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Habitat fragmentation (barriers to fish passage)	Very High	Very High	Very High
2	Altered stream channel	High	High	High
3	Degraded water quality	High	Medium	Medium
4	Altered hydrology	High	Medium	Medium
5	Altered downstream transport (sediment and woody debris)	High	High	High
6	Reduced recruitment	High	Medium	Medium

1.2. Native Salmonids

Threats - Sources of Stress	Habitat fragmentation (barriers to fish passage)	Altered stream channel	Degraded water quality	Altered hydrology	Altered downstream transport (sediment and woody debris)	Reduced recruitment
Stress Rank	*Very High*	*High*	*Medium*	*Medium*	*High*	*Medium*

1. Dams (active or abandoned) — Threat to Target Rank: Very High

Contribution	Very High	Very High	High	Very High	High	High
Reversibility	Medium	Medium	Medium	Medium	Medium	Medium
Threat Rank	Very High	High	Low	Medium	Medium	Low

2. Stream crossings (bridges, roads) — Threat to Target Rank: Very High

Contribution	High	Very High	High	Low	High	Medium
Reversibility	High	High	Medium	High	Medium	Medium
Threat Rank	Very High	High	Low	Low	Medium	Low

3. Irrigation water withdrawal — Threat to Target Rank: Medium

Contribution	Low	Low	High	Very High		Low
Reversibility	Medium	Low	Medium	Medium		Medium
Threat Rank	Medium	Low	Low	Medium	-	Low

1.2. Native Salmonids

Threats - Sources of Stress	Habitat fragmentation (barriers to fish passage)	Altered stream channel	Degraded water quality	Altered hydrology	Altered downstream transport (sediment and woody debris)	Reduced recruitment
Stress Rank	*Very High*	*High*	*Medium*	*Medium*	*High*	*Medium*

Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) — Threat to Target Rank: Medium

Contribution			Medium		High	Medium
Reversibility			High		Medium	High
Threat Rank	-	-	Low	-	Medium	Low

5. Inadequate riparian buffers — Threat to Target Rank: High

Contribution		Low	Very High		Very High	Medium
Reversibility		Medium	Medium		Medium	Medium
Threat Rank	-	Low	Medium	-	High	Low

6. Predation and interspecific competition for resources — Threat to Target Rank: Medium

Contribution					-	Very High
Reversibility					-	Low
Threat Rank	-	-	-	-	-	Medium

1.3 Native Mollusks

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Altered downstream transport (sediment and woody debris)	Very High	Very High	Very High
2	Degraded water quality	High	High	High
3	Altered hydrology	High	Medium	Medium
4	Reduced recruitment	High	High	High
5	Altered stream channel	High	High	High

1.3. Native Mollusks

Threats - Sources of Stress	Altered downstream transport (sediment and woody debris)	Degraded water quality	Altered hydrology	Reduced recruitment	Altered stream channel
Stress Rank	*Very High*	*High*	*Medium*	*High*	*High*

1. Dams (active or abandoned) — Threat to Target Rank: Very High

Contribution	High	Very High	Very High	High	Very High
Reversibility	Medium	Medium	Medium	Medium	Medium
Threat Rank	High	High	Medium	Medium	High

2. Stream crossings (bridges, roads) — Threat to Target Rank: Very High

Contribution	High	Very High	Low	Medium	Very High
Reversibility	Medium	High	High	High	Medium
Threat Rank	High	High	Low	Medium	High

3. Irrigation water withdrawal — Threat to Target Rank: Medium

Contribution		High	High	Low	Low
Reversibility		Medium	Medium	Medium	Low
Threat Rank	-	Medium	Low	Low	Low

1.3. Native Freshwater Mollusks

Threats - Sources of Stress	Altered downstream transport (sediment and woody debris)	Degraded water quality	Altered hydrology	Reduced recruitment	Altered stream channel
Stress Rank	*Very High*	*High*	*Medium*	*High*	*High*

4. Farm, residential, commercial non-point sources of pollution nutrients, pesticides, herbicides, sedimentation) Threat to Target Rank: High

Contribution	High	High	Medium	Low	High
Reversibility	Medium	Medium	High	Medium	Medium
Threat Rank	High	Medium	Low	Low	Medium

5. Inadequate riparian buffers Threat to Target Rank: High

Contribution	High	High		Medium	Low
Reversibility	Medium	Medium		Medium	Medium
Threat Rank	High	Medium	-	Medium	Low

6. Predation and interspecific competition for resources Threat to Target Rank: Low

Contribution				Low	-
Reversibility				Low	-
Threat Rank	-	-	-	Low	-

1.4 Swamp Darter

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Fair	Poor	Poor

Stresses - Altered Key Ecological Attributes		Severity	Scope	Stress Rank
1	Altered downstream transport (sediment and woody debris)	Medium	Medium	Medium
2	Degraded water quality	High	High	High
3	Altered hydrology	High	Medium	Medium
4	Reduced recruitment	High	High	High
5	Altered stream channel	High	High	High
6	Habitat fragmentation (barriers to fish passage)	Very High	Very High	Very High

1.4. Swamp Darter

Threats - Sources of Stress	Altered downstream transport (sediment and woody debris)	Degraded water quality	Altered hydrology	Reduced recruitment	Altered stream channel	Habitat fragmentation (barriers to fish passage)
Stress Rank	*Medium*	*High*	*Medium*	*High*	*High*	*Very High*

1. Dams (active or abandoned) — Threat to Target Rank: Very High

Contribution	High	High	Very High	High	Very High	Very High
Reversibility	Medium	Medium	Medium	Medium	Medium	Medium
Threat Rank	Low	Medium	Medium	Medium	High	Very High

2. Stream crossings (bridges, roads) — Threat to Target Rank: Very High

Contribution	High	Very High	Low	Low	Very High	Very High
Reversibility	Medium	High	Medium	Medium	Medium	Medium
Threat Rank	Low	High	Low	Low	High	Very High

3. Irrigation water withdrawal — Threat to Target Rank: Medium

Contribution		Low	Low	Low	Low	Low
Reversibility		Medium	Medium	Medium	Low	Low
Threat Rank	-	Low	Low	Low	Low	Medium

1.4. Swamp Darter

Threats - Sources of Stress	Altered downstream transport (sediment and woody debris)	Degraded water quality	Altered hydrology	Reduced recruitment	Altered stream channel	Habitat fragmentation (barriers to fish passage)
Stress Rank	*Medium*	*High*	*Medium*	*High*	*High*	*Very High*

4. Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) — Threat to Target Rank: High

Contribution	High	Very High	Medium	Medium	High	
Reversibility	Medium	Medium	High	Medium	Medium	
Threat Rank	Low	High	Low	Medium	Medium	-

5. Inadequate riparian buffers — Threat to Target Rank: High

Contribution	High	Very High		Medium	Low	Low
Reversibility	Medium	Medium		Medium	Medium	Medium
Threat Rank	Low	High	-	Medium	Low	Low

6. Predation and interspecific competition for resources — Threat to Target Rank: Low

Contribution				Low		
Reversibility				Low		
Threat Rank	-	-	-	Low	-	-

1.5 System Threats

Threats Across Targets Specific threats		Diadromous Fish	Native salmonids	Native Mollusks	Swamp Darter	Overall Threat Rank
1	Stream crossings (bridges, roads)	Very High	Very High	Very High	Very High	Very High
2	Dams (active or abandoned)	Very High	Very High	Very High	Very High	Very High
3	Inadequate riparian buffers	High	High	High	High	High
4	Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation)	Medium	Medium	High	High	High
5	Irrigation water withdrawal	Medium	Medium	Medium	Medium	Medium
6	Predation and interspecific competition for resources	Medium	Medium	Low	Low	Medium
Threat Status for Targets		Very High	Very High	Very High	Very High	Very High

Stresses (Altered Key Ecological Attributes) Across Targets		Diadromous Fish	Native salmonids	Native Mollusks	Swamp Darter
1	Altered downstream transport (sediment and woody debris)	High	High	Very High	Medium
2	Altered hydrology	Medium	Medium	Medium	Medium
3	Altered stream channel	High	High	High	High
4	Degraded water quality	Medium	Medium	High	High
5	Habitat fragmentation (barriers to fish passage)	Very High	Very High	-	Very High
6	Reduce recruitment	High	Medium	High	High

2. Stress Matrix: NRCS Fish and Wildlife Action Plan for Coastal Areas

2.1 Salt Marsh and Associated Mudflats

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Poor	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Altered hydrology	Very High	Very High	Very High
2	Altered salinity	High	High	High
3	Altered native plant communities	High	High	High
4	Degraded water quality	High	High	High
5	Habitat fragmentation	High	High	High

2.1. Salt Marsh and Associated Mudflats

Threats - Sources of Stress	Altered hydrology	Altered salinity	Altered native plant communities	Degraded water quality	Habitat fragmentation
Stress Rank	*Very High*	*High*	*High*	*High*	*High*

1. Tidal restrictions (undersized culverts, berms, half-tide dams) Threat to Target Rank: Very High

Contribution	Very High	Very High	Very High	High	High
Reversibility	High	High	High	High	High
Threat Rank	Very High	High	High	High	High

2. Fill (dredge operations and/or road development) Threat to Target Rank: Very High

Contribution	High	High	High	High	Very High
Reversibility	High	High	High	High	High
Threat Rank	Very High	High	High	High	High

3. Residential and commercial non-point sources of pollution (nutrients, pesticides, herbicides, stormwater run-off, sedimentation) Threat to Target Rank: High

Contribution			Medium	Very High	High
Reversibility			Medium	Medium	Low
Threat Rank	-	-	Medium	High	Medium

2.1. Salt Marsh and Associated Mudflats

Threats - Sources of Stress	Altered hydrology	Altered salinity	Altered native plant communities	Degraded water quality	Habitat fragmentation
Stress Rank	*Very High*	*High*	*High*	*High*	*High*

4. Invasive plant species — Threat to Target Rank: Medium

Contribution			High		Low
Reversibility			Medium		Medium
Threat Rank	-	-	Medium	-	Low

5. Ditching (Salt marsh hay harvesting, mosquito control) — Threat to Target Rank: Very High

Contribution	High	Low	Medium	Low	Medium
Reversibility	High	High	High	High	High
Threat Rank	Very High	Medium	Medium	Medium	Medium

2.2 Eelgrass

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Poor	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Degraded water quality	Very High	High	High
2	Reduced eelgrass recruitment	Very High	Very High	Very High

2.2. Eelgrass

Threats - Sources of Stress	Degraded water quality	Reduced eelgrass recruitment
Stress Rank	*High*	*Very High*

1. Residential and commercial non-point sources of pollution (nutrients, pesticides, herbicides, stormwater run-off, sedimentation) Threat to Target Rank: High

Contribution	Medium	Medium
Reversibility	Medium	Medium
Threat Rank (override)		
Threat Rank	Medium	High

2. Loss of local eelgrass beds Threat to Target Rank: Very High

Contribution		Very High
Reversibility		Very High
Threat Rank (override)		
Threat Rank	-	Very High

2.3 Beaches

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Poor	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Habitat fragmentation	High	High	High
2	Soil / sediment stability & movement	High	High	High
3	Altered native plant communities	High	High	High
4	Altered native animal communities	High	High	High

2.3. Beaches

Threats - Sources of Stress	Habitat fragmentation	Soil / sediment stability & movement	Altered native plant communities	Altered native animal communities
Stress Rank	*High*	*High*	*High*	*High*

1. Encroachment by residential and commercial development — Threat to Target Rank: High

Contribution	Very High	High	High	High
Reversibility	Low	Low	Low	Low
Threat Rank	High	Medium	Medium	Medium

2. Disturbance from use by humans — Threat to Target Rank: Very High

Contribution		High	Very High	Very High
Reversibility		High	High	High
Threat Rank	-	High	High	High

3. Predation (gulls, crows, cats, dogs) — Threat to Target Rank: Medium

Contribution				High
Reversibility				Low
Threat Rank	-	-	-	Medium

2.3. Beaches

Threats - Sources of Stress	Habitat fragmentation	Soil / sediment stability & movement	Altered native plant communities	Altered native animal communities
Stress Rank	*High*	*High*	*High*	*High*

4. Invasive plant species — Threat to Target Rank: High

Contribution			Very High	Medium
Reversibility			High	High
Threat Rank	-	-	High	Medium

2.4 System Threats

Threats Across Targets Specific threats		Salt marsh and Mudflat Restoration	Eelgrass Restoration	Dune Restoration	Overall Threat Rank
1	Disturbance from use by humans	-	-	Very High	High
2	Loss of local eelgrass beds	-	Very High	-	High
3	Tidal restrictions (undersized culverts, berms, half-tide dams)	Very High	-	-	High
4	Fill (dredge operations and/or road development)	Very High	-	-	High
5	Ditching (Salt marsh hay harvesting, mosquito control)	Very High	-	-	High
6	Residential and commercial non-point sources of pollution (nutrients, pesticides, herbicides, stormwater run-off, sedimentation)	High	High	-	High
7	Invasive plant species	Medium	-	High	Medium
8	Encroachment by residential and commercial development	-	-	High	Medium
9	Predation (gulls, crows, cats, dogs)	-	-	Medium	Low
Threat Status for Targets		Very High	High	High	Very High

Stresses (Altered Key Ecological Attributes) Across Targets		Salt marsh and Mudflat Restoration	Eelgrass Restoration	Dune Restoration
1	Altered hydrology	Very High	-	-
2	Altered native animal communities	-	-	High
3	Altered native plant communities	High	-	High
4	Altered salinity	High	-	-
5	Degraded water quality	High	High	-
6	Habitat fragmentation	High	-	High
7	Reduced eelgrass recruitment	-	Very High	-
8	Soil / sediment stability & movement	-	-	High

3. Stress Matrix: NRCS Fish and Wildlife Action Plan for Lakes or Ponds

3.1 Diadromous Species

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Fair	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Habitat fragmentation (barriers to fish passage)	Very High	Very High	Very High
2	Degraded water quality	High	Medium	Medium
3	Reduced recruitment	Medium	Medium	Medium

3.1. Diadromous Species

Threats - Sources of Stress	Habitat fragmentation (barriers to fish passage)	Degraded water quality	Reduced recruitment
Stress Rank	*Very High*	*Medium*	*Medium*

1. Dams (active or abandoned) — Threat to Target Rank: High

Contribution	High	Medium	Very High
Reversibility	Medium	Medium	Medium
Threat Rank	High	Low	Medium

2. Irrigation water withdrawal — Threat to Target Rank: Low

Contribution		Low	Low	Low
Reversibility		Medium	Medium	Medium
Threat Rank	-	Medium	Low	Low

3. Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) — Threat to Target Rank: Medium

Contribution		Very High	Medium
Reversibility		High	High
Threat Rank	-	Medium	Low

3.1. Diadromous Species

Threats - Sources of Stress	Habitat fragmentation (barriers to fish passage)	Degraded water quality	Reduced recruitment
Stress Rank	*Very High*	*Medium*	*Medium*

4. Roads (run-off) — Threat to Target Rank: Medium

Contribution		Very High	Medium
Reversibility		Low	High
Threat Rank (override)			
Threat Rank	-	Medium	Low

5. Inadequate riparian buffers — Threat to Target Rank: Low

Contribution		High	Medium
Reversibility		Medium	Medium
Threat Rank (override)			
Threat Rank	-	Low	Low

6. Predation and competition from introduced fish — Threat to Target Rank: Low

Contribution			High
Reversibility			Low
Threat Rank (override)			
Threat Rank	-	-	Low

3.2 Arctic Char

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Good	Good	Fair	Good

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Degraded water quality	Very High	Medium	Medium
2	Reduced recruitment	High	Medium	Medium

3.2. Arctic Char

Threats - Sources of Stress	Degraded water quality	Reduced recruitment
Stress Rank	*Medium*	*Medium*

1. Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) — Threat to Target Rank: Medium

Contribution	Very High	High
Reversibility	Medium	Medium
Threat Rank (override)		
Threat Rank	Medium	Low

2. Inadequate riparian buffers — Threat to Target Rank: Medium

Contribution	Very High	Medium
Reversibility	Medium	Medium
Threat Rank (override)		
Threat Rank	Medium	Low

3. Predation and competition from introduced fish — Threat to Target Rank: Medium

Contribution		Very High
Reversibility		Low
Threat Rank (override)		
Threat Rank	-	Medium

3.2. Arctic Char

Threats - Sources of Stress	Degraded water quality	Reduced recruitment
Stress Rank	*Medium*	*Medium*

4. Roads (run-off) Threat to Target Rank: Medium

Contribution	Very High	Medium
Reversibility	Low	Low
Threat Rank	Medium	Low

3.3 Lake Whitefish

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Good	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Degraded water quality	Very High	Medium	Medium
2	Reduced recruitment	High	Medium	Medium

3.3 Lake Whitefish

Threats - Sources of Stress	Degraded water quality	Reduced recruitment
Stress Rank	*Medium*	*Medium*

1. Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) — Threat to Target Rank: Medium

Contribution	Very High	High
Reversibility	Medium	Medium
Threat Rank	Medium	Low

2. Inadequate riparian buffers — Threat to Target Rank: Medium

Contribution	Very High	Medium
Reversibility	Medium	Medium
Threat Rank	Medium	Low

3. Predation and competition from introduced fish — Threat to Target Rank: Medium

Contribution		Very High
Reversibility		Low
Threat Rank	-	Medium

3.3 Lake Whitefish

Threats - Sources of Stress	Degraded water quality	Reduced recruitment
Stress Rank	*Medium*	*Medium*

4. Roads (run-off) Threat to Target Rank: Medium

Contribution	Very High	Medium
Reversibility	Low	Low
Threat Rank	Medium	Low

3.4 Swamp Darter

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Poor	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Degraded water quality	Very High	Very High	Very High
2	Reduced recruitment	High	Medium	Medium
3	Habitat fragmentation (barriers to fish passage)	High	High	High

3.4. Swamp Darter

Threats - Sources of Stress	Degraded water quality	Reduced recruitment	Habitat fragmentation (barriers to fish passage)
Stress Rank	*Very High*	*Medium*	*High*

1. Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation) Threat to Target Rank: Very High

Contribution	Very High	High	
Reversibility	Medium	Medium	
Threat Rank	Very High	Low	-

2. Inadequate riparian buffers Threat to Target Rank: Very High

Contribution	Very High	Medium	Medium
Reversibility	Medium	Medium	Medium
Threat Rank	Very High	Low	Medium

3. Predation and competition from introduced fish Threat to Target Rank: Medium

Contribution		Very High	
Reversibility		Low	
Threat Rank	-	Medium	-

3.4. Swamp Darter

Threats - Sources of Stress	Degraded water quality	Reduced recruitment	Habitat fragmentation (barriers to fish passage)
Stress Rank	*Very High*	*Medium*	*High*

4. Roads (run-off) — Threat to Target Rank: High

Contribution	High	Medium	Medium
Reversibility	Low	Low	High
Threat Rank	High	Low	Medium

5. Dams (active or abandoned) — Threat to Target Rank: High

Contribution	High	High	Very High
Reversibility	Medium	Medium	Medium
Threat Rank	High	Low	High

3.5 System Threats

Threats Across Targets Specific threats		Diadromous species	Arctic char	Lake whitefish	Swamp darter	Overall Threat Rank
1	Farm, residential, commercial non-point sources of pollution (nutrients, pesticides, herbicides, sedimentation)	Medium	Medium	Medium	Very High	High
2	Inadequate riparian buffers	Low	Medium	Medium	Very High	High
3	Dams (active or abandoned)	High	-	-	High	High
4	Roads (run-off)	Medium	Medium	Medium	High	Medium
5	Predation and competition from introduced fish	Low	Medium	Medium	Medium	Medium
6	Irrigation water withdrawal	Low	-	-	-	Low
Threat Status for Targets		Medium	Medium	Medium	Very High	High

Stresses (Altered Key Ecological Attributes) Across Targets		Diadromous species	Arctic char	Lake whitefish	Swamp darter
1	Degraded water quality	Medium	Medium	Medium	Very High
2	Habitat fragmentation (barriers to fish passage)	Very High	-	-	High
3	Reduced recruitment	Medium	Medium	Medium	Medium

4. Stress Matrix: NRCS Fish and Wildlife Action Plan for Agricultural Land

4.1 Upland Riparian Buffers

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Fragmentation: buffers degraded or lacking	High	High	High
2	Alteration of native plant communities	High	High	High
3	Increased soil disturbance, erosion and deposition	Medium	Medium	Medium

4.1. Upland Riparian Buffers

Threats - Sources of Stress	Fragmentation: buffers degraded or lacking	Alteration of native plant communities	Increased soil disturbance, erosion and deposition
Stress Rank	*High*	*High*	*Medium*

1. Conversion to agricultural uses — Threat to Target Rank: Medium

Contribution	High	High	High
Reversibility	Medium	Medium	Medium
Threat Rank	Medium	Medium	Low

2. Invasive species — Threat to Target Rank: High

Contribution	Very High	High	-
Reversibility	Medium	High	-
Threat Rank	High	High	-

3. Disturbance (farm equipment, livestock, ATV etc.) — Threat to Target Rank: Medium

Contribution	Medium	High	Medium
Reversibility	High	Medium	High
Threat Rank	Medium	Medium	Low

4. Ice rafting — Threat to Target Rank: Low

Contribution	Low	Low	Low
Reversibility	Low	Low	Low
Threat Rank	Low	Low	Low

4.2 Grassland Birds

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Poor	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Loss of open agricultural land	Very High	High	High
2	Degradation of existing nesting habitat	Very High	High	High
3	Population structure & recruitment	Very High	High	High
4	Habitat fragmentation	High	Medium	Medium
5	Habitat succession	Very High	High	High

4.2. Grassland Birds

Threats - Sources of Stress	Loss of open agricultural land	Degradation of existing nesting habitat	Population structure & recruitment	Habitat fragmentation	Habitat succession
Stress Rank	*High*	*High*	*High*	*Medium*	*High*

1. Conversion to commercial/residential development — Threat to Target Rank: High

Contribution	Very High	Very High	High	High	Low
Reversibility	Low	Low	Low	Low	Low
Threat Rank	High	High	Medium	Low	Low

2. Intensive agriculture (haying, grazing) — Threat to Target Rank: High

Contribution	Low	Very High	Very High	Low	Low
Reversibility	Low	Medium	Medium	Medium	Low
Threat Rank	Low	High	High	Low	Low

3. Invasive species — Threat to Target Rank: Medium

Contribution	Medium	High	Medium	Medium	High
Reversibility	Medium	Medium	Medium	Medium	Medium
Threat Rank	Medium	Medium	Medium	Low	Medium

4.2. Grassland Birds

Threats - Sources of Stress	Loss of open agricultural land	Degradation of existing nesting habitat	Population structure & recruitment	Habitat fragmentation	Habitat succession
Stress Rank	*High*	*High*	*High*	*Medium*	*High*

4. Conversion to forestland — Threat to Target Rank: High

Contribution	High	High	High	Very High	Very High
Reversibility	Medium	Medium	Medium	Medium	Medium
Threat Rank	Medium	Medium	Medium	Medium	High

4.3 New England Cottontail

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Poor	Poor	Poor	Poor

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Loss of early successional native forest	High	High	High
2	Degradation of early successional native forest	Medium	Medium	Medium
3	Habitat fragmentation	Very High	High	High
4	Loss of old field habitat	Very High	High	High
5	Degradation of old field habitat	Medium	Medium	Medium
6	Population structure & recruitment	Very High	Very High	Very High

4.3. New England Cottontail

Threats - Sources of Stress	Loss of early successional native forest	Degradation of early successional native forest	Habitat fragmentation	Loss of old field habitat	Degradation of old field habitat	Population structure & recruitment
Stress Rank	*High*	*Medium*	*High*	*High*	*Medium*	*Very High*

1. Conversion to commercial/residential development — Threat to Target Rank: High

Contribution	Medium	Medium	Very High	High	Medium	High
Reversibility	Low	Low	Low	Low	Low	Low
Threat Rank	Low	Low	High	Medium	Low	High

2. Intensive agriculture (haying, grazing) — Threat to Target Rank: Medium

Contribution	Low	-	Medium	Low	-	Low
Reversibility	Low	-	Medium	Medium	-	Low
Threat Rank	Low	-	Medium	Low	-	Medium

3. Invasive species — Threat to Target Rank: High

Contribution	Low	Very High	Low	Medium	High	High
Reversibility	Low	Medium	Medium	Medium	Medium	Medium
Threat Rank	Low	Medium	Low	Medium	Low	High

4.3. New England Cottontail

Threats - Sources of Stress	Loss of early successional native forest	Degradation of early successional native forest	Habitat fragmentation	Loss of old field habitat	Degradation of old field habitat	Population structure & recruitment
Stress Rank	*High*	*Medium*	*High*	*High*	*Medium*	*Very High*

4. Forest succession — Threat to Target Rank: Very High

Contribution	Very High	Low	High	High	Low	Very High
Reversibility	High	Low	High	High	Low	High
Threat Rank	High	Low	High	High	Low	Very High

5. Interspecific competition — Threat to Target Rank: Medium

Contribution						Medium
Reversibility						Low
Threat Rank	-	-	-	-	-	Medium

6. Road mortality — Threat to Target Rank: High

Contribution			Very High			Medium
Reversibility			Low			Low
Threat Rank	-	-	High	-	-	Medium

4.3. New England Cottontail

Threats - Sources of Stress	Loss of early successional native forest	Degradation of early successional native forest	Habitat fragmentation	Loss of old field habitat	Degradation of old field habitat	Population structure & recruitment
Stress Rank	*High*	*Medium*	*High*	*High*	*Medium*	*Very High*

7. Predation — Threat to Target Rank: High

Contribution						High
Reversibility						Low
Threat Rank (override)						
Threat Rank	-	-	-	-	-	High

4.4 System Threats

Threats Across Targets Specific threats		Upland Riparian Buffers	Grassland Birds	New England Cottontail	Overall Threat Rank
1	Forest succession	-	-	Very High	High
2	Invasive species	High	Medium	High	High
3	Conversion to commercial/residential development	-	High	High	High
4	Intensive agriculture (haying, grazing)	-	High	Medium	Medium
5	Predation	-	-	High	Medium
6	Road mortality	-	-	High	Medium
7	Conversion to forestland	-	High	-	Medium
8	Disturbance (farm equipment, livestock, ATV etc.)	Medium	-	-	Low
9	Conversion to agricultural uses	Medium	-	-	Low
10	Interspecific competition	-	-	Medium	Low
11	Ice rafting	Low	-	-	Low
Threat Status for Targets		Medium	High	Very High	Very High

Stresses (Altered Key Ecological Attributes) Across Targets		Upland Riparian Buffers	Grassland Birds	New England Cottontail
1	Alteration of native plant communities	High	-	-
2	Degradation of existing nesting habitat	-	High	-
3	Degradation of early successional native forest	-	-	Medium
4	Degradation of old field habitat	-	-	Medium
5	Fragmentation: buffers degraded or lacking	High	-	-
6	Habitat fragmentation	-	Medium	High
7	Habitat succession	-	High	-
8	Increased soil disturbance, erosion and deposition	Medium	-	-
9	Loss of early successional native forest	-	-	High
10	Loss of old field habitat	-	-	High
11	Loss of open agricultural land	-	High	-
12	Population structure & recruitment	-	High	Very High

5. Stress Matrix: NRCS Fish and Wildlife Action Plan for Freshwater Wetlands

5.1 Emergent Wetlands

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Altered hydrology	Very High	High	High
2	Degraded water quality	High	High	High
3	Altered native plant communities	Very High	High	High
4	Altered native animal communities (increased mortality)	High	Medium	Medium
5	Wetland loss	Medium	Medium	Medium
6	Connectivity with adjacent forested uplands	Very High	Medium	Medium

5.1. Emergent Wetlands

Threats - Sources of Stress	Altered hydrology	Degraded water quality	Altered native plant communities	Altered native animal communities (increased mortality)	Wetland loss	Connectivity with adjacent forested uplands
Stress Rank	*High*	*High*	*High*	*Medium*	*Medium*	*Medium*

1. Dam removal or failure (man-made or beaver) — Threat to Target Rank: Medium

Contribution	High		High	Low	Medium	
Reversibility	Medium		Medium	Medium	Medium	
Threat Rank	Medium	-	Medium	Low	Low	-

2. Roads and road development (including forest access roads) — Threat to Target Rank: High

Contribution	Medium	Very High	Medium	Very High	Medium	Very High
Reversibility	High	Medium	Medium	Medium	Low	Medium
Threat Rank	Medium	High	Medium	Medium	Low	Medium

3. Loss of adequate riparian forest buffers due to landuse — Threat to Target Rank: High

Contribution	Medium	High	Very High	High	Medium	Very High
Reversibility	Low	High	Medium	Low	Low	Medium
Threat Rank	Low	High	High	Low	Low	Medium

5.1. Emergent Wetlands

Threats - Sources of Stress	Altered hydrology	Degraded water quality	Altered native plant communities	Altered native animal communities (increased mortality)	Wetland loss	Connectivity with adjacent forested uplands
Stress Rank	*High*	*High*	*High*	*Medium*	*Medium*	*Medium*

4. Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.) Threat to Target Rank: Medium

Contribution		High	Medium	High		
Reversibility		Medium	Medium	Medium		
Threat Rank	-	Medium	Medium	Low	-	-

5. Invasive species Threat to Target Rank: High

Contribution			Very High			
Reversibility			Medium			
Threat Rank	-	-	High	-	-	-

6. All terrain vehicles, livestock access, etc. Threat to Target Rank: Medium

Contribution	Low	Medium	Low	Low	-	
Reversibility	High	High	High	High	-	
Threat Rank	Medium	Medium	Medium	Low	-	-

5.1. Emergent Wetlands

Threats - Sources of Stress	Altered hydrology	Degraded water quality	Altered native plant communities	Altered native animal communities (increased mortality)	Wetland loss	Connectivity with adjacent forested uplands
Stress Rank	*High*	*High*	*High*	*Medium*	*Medium*	*Medium*

7. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) Threat to Target Rank: Medium

Contribution	High	High	Medium	Low	High	Very High
Reversibility	Low	Medium	Medium	Low	Low	Low
Threat Rank	Medium	Medium	Medium	Low	Low	Medium

8. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) Threat to Target Rank: High

Contribution	Low	Low	High	Medium	Low	High
Reversibility	High	High	High	Medium	High	High
Threat Rank	Medium	Medium	High	Low	Low	Medium

9. Lack of road underpasses for wildlife passage Threat to Target Rank: Medium

Contribution				Very High		
Reversibility				High		
Threat Rank	-	-	-	Medium	-	-

5.2 Vernal Pools

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Connectivity with adjacent forested uplands	Very High	Medium	Medium
2	Altered native plant communities	High	High	High
3	Degraded water quality	Medium	Medium	Medium
4	Altered hydrology	High	Medium	Medium
5	Wetland loss	High	Medium	Medium
6	Altered native animal communities (increased mortality)	Very High	Very High	Very High

5.2. Vernal Pools

Threats - Sources of Stress	Connectivity with adjacent forested uplands	Altered native plant communities	Degraded water quality	Altered hydrology	Wetland loss	Altered native animal communities (increased mortality)
Stress Rank	*Medium*	*High*	*Medium*	*Medium*	*Medium*	*Very High*

1. Roads and road development (including forest access roads) Threat to Target Rank: Very High

Contribution	Very High	Medium	Very High	Medium	Medium	Very High
Reversibility	Medium	Medium	Medium	High	Low	Medium
Threat Rank	Medium	Medium	Medium	Low	Low	Very High

2. Loss of adequate riparian forest buffers due to landuse Threat to Target Rank: High

Contribution	Very High	Very High	High	Medium	Medium	High
Reversibility	Medium	Medium	High	Low	Low	Low
Threat Rank	Medium	High	Medium	Low	Low	High

3. Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.) Threat to Target Rank: Very High

Contribution			High			Very High
Reversibility			High			Medium
Threat Rank	-	-	Medium	-	-	Very High

5.2. Vernal Pools

Threats - Sources of Stress	Connectivity with adjacent forested uplands	Altered native plant communities	Degraded water quality	Altered hydrology	Wetland loss	Altered native animal communities (increased mortality)
Stress Rank	*Medium*	*High*	*Medium*	*Medium*	*Medium*	*Very High*

4. Invasive species — Threat to Target Rank: High

Contribution		Very High				
Reversibility		Medium				
Threat Rank	-	High	-	-	-	-

5. All terrain vehicles, livestock access, etc. — Threat to Target Rank: High

Contribution		Low	Medium	Low	-	Low
Reversibility		High	High	High	-	High
Threat Rank	-	Medium	Low	Low	-	High

6. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) — Threat to Target Rank: High

Contribution	High	High	Medium	Medium	Low	Medium
Reversibility	High	High	High	High	High	Medium
Threat Rank	Medium	High	Low	Low	Low	High

5.2. Vernal Pools

Threats - Sources of Stress	Connectivity with adjacent forested uplands	Altered native plant communities	Degraded water quality	Altered hydrology	Wetland loss	Altered native animal communities (increased mortality)
Stress Rank	*Medium*	*High*	*Medium*	*Medium*	*Medium*	*Very High*

7. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) Threat to Target Rank: High

Contribution		Medium		High	Very High	High
Reversibility		Low		Low	Low	Low
Threat Rank (override)						
Threat Rank	-	Low	-	Low	Medium	High

5.3 Floodplain Forest

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Altered hydrology	Very High	Very High	Very High
2	Connectivity with adjacent forested uplands	High	Medium	Medium
3	Altered native plant communities	Very High	High	High
4	Increased soil erosion and deposition	Medium	Medium	Medium
5	Wetland loss	Low	Low	Low
6	Degraded water quality	Medium	Medium	Medium

5.3. Floodplain Forest

Threats - Sources of Stress	Altered hydrology	Connectivity with adjacent forested uplands	Altered native plant communities	Increased soil erosion and deposition	Wetland loss	Degraded water quality
Stress Rank	*Very High*	*Medium*	*High*	*Medium*	*Low*	*Medium*

1. Dams — Threat to Target Rank: Very High

Contribution	Very High	Very High	High	High	High	Medium
Reversibility	Medium	Medium	Medium	Medium	Medium	Low
Threat Rank	Very High	Medium	Medium	Low	Low	Low

2. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) — Threat to Target Rank: High

Contribution	Low	Low	Low	Low	Low	Medium
Reversibility	High	High	High	High	High	High
Threat Rank	High	Low	Medium	Low	Low	Low

3. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) — Threat to Target Rank: Medium

Contribution	Medium	High	Low	Medium	Medium	Low
Reversibility	Low	Low	High	High	Medium	Low
Threat Rank	Medium	Low	Medium	Low	Low	Low

5.3. Floodplain Forest

Threats - Sources of Stress	Altered hydrology	Connectivity with adjacent forested uplands	Altered native plant communities	Increased soil erosion and deposition	Wetland loss	Degraded water quality
Stress Rank	*Very High*	*Medium*	*High*	*Medium*	*Low*	*Medium*

4. Stream crossings — Threat to Target Rank: High

Contribution	Medium	High		Medium	Medium	Low
Reversibility	Medium	Low		High	High	Low
Threat Rank	High	Low	-	Low	Low	Low

5. Invasive species — Threat to Target Rank: High

Contribution			Very High			
Reversibility			Medium			
Threat Rank	-	-	High	-	-	-

6. All terrain vehicles, livestock access, etc. — Threat to Target Rank: Medium

Contribution			Low	Medium		Medium
Reversibility			High	High		High
Threat Rank	-	-	Medium	Low	-	Low

5.3. Floodplain Forest

Threats - Sources of Stress	Altered hydrology	Connectivity with adjacent forested uplands	Altered native plant communities	Increased soil erosion and deposition	Wetland loss	Degraded water quality
Stress Rank	*Very High*	*Medium*	*High*	*Medium*	*Low*	*Medium*

7. Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.) Threat to Target Rank: Medium

Contribution						Very High
Reversibility						High
Threat Rank	-	-	-	-	-	Medium

8. Roads and road development (including forest access roads) Threat to Target Rank: Medium

Contribution	Medium	Very High	Medium	High		High
Reversibility	Low	Low	Low	Medium		Medium
Threat Rank	Medium	Medium	Low	Low	-	Low

5.4 System Threats

Threats Across Targets Specific threats		Emergent Wetlands	Vernal Pools	Floodplain Forest	Overall Threat Rank
1	Roads and road development (including forest access roads)	High	Very High	Medium	High
2	Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.)	Medium	Very High	Medium	High
3	Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.)	High	High	High	High
4	Invasive species	High	High	High	High
5	Dams	-	-	Very High	High
6	Loss of adequate riparian forest buffers due to land use	High	High	-	High
7	Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.)	Medium	High	Medium	Medium
8	All terrain vehicles, livestock access, etc.	Medium	High	Medium	Medium
9	Stream crossings	-	-	High	Medium
10	Lack of road underpasses for wildlife passage	Medium	-	-	Low
11	Dam removal or failure (man-made or beaver)	Medium	-	-	Low
Threat Status for Targets		High	Very High	Very High	Very High

Stresses (Altered Key Ecological Attributes) Across Targets		Emergent Wetlands	Vernal Pools	Floodplain Forest
1	Altered hydrology	High	Medium	Very High
2	Altered native animal communities (increased mortality)	Medium	Very High	-
3	Altered native plant communities	High	High	High
4	Connectivity with adjacent forested uplands	Medium	Medium	Medium
5	Degraded water quality	High	Medium	Medium
6	Increased soil erosion and deposition	-	-	Medium
7	Wetland loss	Medium	Medium	Low

6. Stress Matrix: NRCS Fish and Wildlife Action Plan for Forest and Woodland

6.1 Forest Condition

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Less diverse mosaic of different aged forest stands	High	High	High
2	Habitat fragmentation	Very High	High	High
3	Altered native plant communities	High	High	High
4	Increased soil erosion and deposition	Medium	Medium	Medium
5	Reduced availability of snags and cavity trees	Medium	High	Medium

6.1. Forest Condition

Threats - Sources of Stress	Less diverse mosaic of different aged forest stands	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Reduced availability of snags and cavity trees
Stress Rank	*High*	*High*	*High*	*Medium*	*Medium*

1. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) Threat to Target Rank: High

Contribution	High	Low	Very High	Medium	Very High
Reversibility	High	High	High	High	High
Threat Rank	High	Medium	High	Low	Medium

2. Invasive species Threat to Target Rank: Medium

Contribution			High	-	High
Reversibility			Medium	-	Medium
Threat Rank	-	-	Medium	-	Low

3. Roads and road development (including forest access roads) Threat to Target Rank: High

Contribution		Very High	Medium	Very High	
Reversibility		Low	Medium	High	
Threat Rank	-	High	Medium	Medium	-

6.1. Forest Condition

Threats - Sources of Stress	Less diverse mosaic of different aged forest stands	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Reduced availability of snags and cavity trees
Stress Rank	*High*	*High*	*High*	*Medium*	*Medium*

4. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) Threat to Target Rank: High

Contribution	Medium	Very High	Very High	High	High
Reversibility	Low	Low	Medium	Low	Medium
Threat Rank	Low	High	High	Low	Low

5. Stream crossings Threat to Target Rank: Medium

Contribution				High	
Reversibility				Very High	
Threat Rank	-	-	-	Medium	-

6.2 Vernal Pools

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Connectivity with adjacent forested uplands	Very High	Medium	Medium
2	Altered native plant communities	High	High	High
3	Degraded water quality	Medium	Medium	Medium
4	Altered hydrology	High	Medium	Medium
5	Habitat loss	High	Medium	Medium
6	Altered native animal communities (increased mortality)	Very High	Very High	Very High

6.2. Vernal Pools

Threats - Sources of Stress	Connectivity with adjacent forested uplands	Altered native plant communities	Degraded water quality	Altered hydrology	Habitat loss	Altered native animal communities (increased mortality)
Stress Rank	*Medium*	*High*	*Medium*	*Medium*	*Medium*	*Very High*

1. Roads and road development (including forest access roads) Threat to Target Rank: Very High

Contribution	Very High	Medium	Very High	Medium	Medium	Very High
Reversibility	Medium	Medium	Medium	High	Low	Medium
Threat Rank	Medium	Medium	Medium	Low	Low	Very High

2. Loss of adequate riparian forest buffers due to land use Threat to Target Rank: High

Contribution	Very High	Very High	High	Medium	Medium	High
Reversibility	Medium	Medium	High	Low	Low	Low
Threat Rank	Medium	High	Medium	Low	Low	High

3. Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.) Threat to Target Rank: Very High

Contribution			High			Very High
Reversibility			High			Medium
Threat Rank	-	-	Medium	-	-	Very High

6.2. Vernal Pools

Threats - Sources of Stress	Connectivity with adjacent forested uplands	Altered native plant communities	Degraded water quality	Altered hydrology	Habitat loss	Altered native animal communities (increased mortality)
Stress Rank	*Medium*	*High*	*Medium*	*Medium*	*Medium*	*Very High*

4. Invasive species — Threat to Target Rank: High

Contribution		Very High				
Reversibility		Medium				
Threat Rank	-	High	-	-	-	-

5. All terrain vehicles, livestock access, etc. — Threat to Target Rank: High

Contribution		Low	Medium	Low	-	Low
Reversibility		Medium	High	High	-	High
Threat Rank	-	Low	Low	Low	-	High

6. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) — Threat to Target Rank: High

Contribution	High	High	Medium	Medium	Low	Medium
Reversibility	High	High	High	High	High	Medium
Threat Rank	Medium	High	Low	Low	Low	High

6.2. Vernal Pools

Threats - Sources of Stress	Connectivity with adjacent forested uplands	Altered native plant communities	Degraded water quality	Altered hydrology	Habitat loss	Altered native animal communities (increased mortality)
Stress Rank	*Medium*	*High*	*Medium*	*Medium*	*Medium*	*Very High*

7. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) Threat to Target Rank: High

Contribution		Medium		High	Very High	High
Reversibility		Low		Low	Low	Low
Threat Rank	-	Low	-	Low	Medium	High

6.3 Upland Riparian Forest Buffers

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Habitat fragmentation	Very High	High	High
2	Altered native plant communities	High	High	High
3	Increased soil erosion and deposition	High	High	High
4	Size and extent of characteristic riparian communities	High	High	High

6.3. Upland Riparian Forest Buffers

Threats - Sources of Stress	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Size and extent of characteristic riparian communities
Stress Rank	*High*	*High*	*High*	*High*

1. Loss of adequate riparian forest buffers due to land use — Threat to Target Rank: High

Contribution	Very High	High	High	High
Reversibility	Low	Medium	High	High
Threat Rank	High	Medium	Medium	Medium

2. Invasive species — Threat to Target Rank: High

Contribution	Medium	Very High		High
Reversibility	Medium	Medium		Medium
Threat Rank	Medium	High	-	Medium

3. All terrain vehicles, livestock access, etc. — Threat to Target Rank: Medium

Contribution		Low	Very High	
Reversibility		High	High	
Threat Rank	-	Medium	Medium	-

6.3. Upland Riparian Forest Buffers

Threats - Sources of Stress	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Size and extent of characteristic riparian communities
Stress Rank	*High*	*High*	*High*	*High*

4. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) Threat to Target Rank: Very High

Contribution	High	High	Very High	Very High
Reversibility	High	Medium	High	High
Threat Rank	High	Medium	High	High

5. Roads and road development (Including forest access roads) Threat to Target Rank: High

Contribution	Very High	Medium	Very High	High
Reversibility	Medium	Medium	Medium	Medium
Threat Rank	High	Medium	High	Medium

6.4 Floodplain Forest

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Altered hydrology	Very High	Very High	Very High
2	Habitat fragmentation	High	Medium	Medium
3	Altered native plant communities	Very High	High	High
4	Increased soil erosion and deposition	High	High	High
5	Habitat loss	Low	Low	Low
6	Degraded water quality	Medium	Medium	Medium

6.4. Floodplain Forest

Threats - Sources of Stress	Altered hydrology	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Habitat Loss	Degraded water quality
Stress Rank	*Very High*	*Medium*	*High*	*High*	*Low*	*Medium*

1. Dams — Threat to Target Rank: Very High

Contribution	Very High	Very High	High	High	High	Medium
Reversibility	Medium	Medium	Medium	Medium	Medium	Low
Threat Rank	Very High	Medium	Medium	Medium	Low	Low

2. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) — Threat to Target Rank: High

Contribution	Low	Low	Low	Low	Low	Medium
Reversibility	High	High	High	High	High	High
Threat Rank	High	Low	Medium	Medium	Low	Low

3. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) — Threat to Target Rank: Medium

Contribution	Medium	High	Low	Medium	Medium	Low
Reversibility	Low	Low	High	High	Medium	Low
Threat Rank	Medium	Low	Medium	Medium	Low	Low

6.4. Floodplain Forest

Threats - Sources of Stress	Altered hydrology	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Habitat Loss	Degraded water quality
Stress Rank	*Very High*	*Medium*	*High*	*High*	*Low*	*Medium*

4. Stream crossings — Threat to Target Rank: High

Contribution	Medium	High		Medium	Medium	Low
Reversibility	Medium	Low		High	High	Low
Threat Rank	High	Low	-	Medium	Low	Low

5. Invasive species — Threat to Target Rank: High

Contribution			Very High			
Reversibility			Medium			
Threat Rank	-	-	High	-	-	-

6. All terrain vehicles, livestock access, etc. — Threat to Target Rank: Medium

Contribution			Low	Medium		Medium
Reversibility			High	High		High
Threat Rank	-	-	Medium	Medium	-	Low

6.4. Floodplain Forest

Threats - Sources of Stress	Altered hydrology	Habitat fragmentation	Altered native plant communities	Increased soil erosion and deposition	Habitat Loss	Degraded water quality
Stress Rank	*Very High*	*Medium*	*High*	*High*	*Low*	*Medium*

7. Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.) Threat to Target Rank: Medium

Contribution						Very High
Reversibility						High
Threat Rank	-	-	-	-	-	Medium

8. Roads and road development (including forest access roads) Threat to Target Rank: Medium

Contribution	Medium	Very High	Medium	High		High
Reversibility	Low	Low	Low	Medium		Medium
Threat Rank	Medium	Medium	Low	Medium	-	Low

6.5 Deer Wintering Yards

Viability Summary	Landscape Context	Condition	Size	Viability Rank
	Fair	Fair	Fair	Fair

	Stresses - Altered Key Ecological Attributes	Severity	Scope	Stress Rank
1	Habitat fragmentation	High	High	High
2	Less diverse mosaic of different aged forest stands	High	High	High
3	Altered native plant communities	Medium	Medium	Medium
4	Habitat loss	High	High	High

6.5. Deer Wintering Yards

Threats - Sources of Stress	Habitat fragmentation	Less diverse mosaic of different aged forest stands	Altered native plant communities	Habitat loss
Stress Rank	*High*	*High*	*Medium*	*High*

1. Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.) Threat to Target Rank: Very High

Contribution	Very High	Very High	Medium	Very High
Reversibility	Medium	Medium	High	Medium
Threat Rank	High	High	Medium	High

2. Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.) Threat to Target Rank: High

Contribution	Very High	Very High		High
Reversibility	Medium	High		Medium
Threat Rank	High	High	-	Medium

3. Invasive species Threat to Target Rank: Low

Contribution			Medium	
Reversibility			Medium	
Threat Rank	-	-	Low	-

6.5. Deer Wintering Yards

Threats - Sources of Stress	Habitat fragmentation	Less diverse mosaic of different aged forest stands	Altered native plant communities	Habitat loss
Stress Rank	*High*	*High*	*Medium*	*High*

4. Pest infestation (e.g., woolly adelgid, spruce budworm, etc.) Threat to Target Rank: Medium

Contribution	Medium	High		High
Reversibility	Low	Low		Low
Threat Rank	Low	Medium	-	Medium

6.6 System Threats

Threats Across Targets Specific threats		Forest Diversity and Condition	Vernal Pools	Upland Riparian Forest Buffers	Floodplain Forest	Deer Wintering Yards	Overall Threat Rank
1	Intensive production forestry practices (e.g., even-aged management, clear-cuts, shorter rotations, crop tree release, selective species management, etc.)	High	High	Very High	High	High	Very High
2	Invasive species	Medium	High	High	High	Low	High
3	Nutrient and chemical inputs due to human encroachment/needs (e.g., agriculture, commercial and residential development, salting of roads, etc.)	-	Very High	-	Medium	-	High
4	Roads and road development (including forest access roads)	High	Very High	High	Medium	-	High
5	Dams	-	-	-	Very High	-	High
6	Loss of adequate riparian forest buffers due to land use conversion	-	High	High	-	-	High
7	Conversion due to human encroachment (e.g., agriculture, commercial and residential development, etc.)	High	High	-	Medium	High	High
8	All terrain vehicles, livestock access, etc.	-	High	Medium	Medium	-	Medium
9	Stream crossings	Medium	-	-	High	-	Medium
9	Pest infestations (e.g., woolly adelgid, spruce budworm, etc.)	-	-	-	-	Medium	Low
Threat Status for Targets		High	Very High	Very High	Very High	High	Very High

Stresses (Altered Key Ecological Attributes) Across Targets		Forest Diversity and Condition	Vernal Pools	Upland Riparian Forest Buffers	Floodplain Forest	Deer Wintering Yards
1	Altered hydrology	-	Medium	-	Very High	-
2	Altered native animal communities (increased mortality)	-	Very High	-	-	-
3	Altered native plant communities	High	High	High	High	Medium
4	Connectivity with adjacent forested uplands	-	Medium	-	-	-
5	Degraded water quality	-	Medium	-	Medium	-
6	Habitat fragmentation	High	-	High	Medium	High
7	Increased soil erosion and deposition	Medium	-	High	High	-
8	Less diverse mosaic of different aged forest stands	High	-	-	-	High
9	Reduced availability of snags and cavity trees	Medium	-	-	-	-
10	Habitat loss		Medium		Low	High
11	Reduced availability of snags and cavity trees	Medium	-	-	-	-
12	Size and extent of characteristic riparian communities	-	-	High	-	-

Appendix B. Conservation Partners

The following agencies or organizations assisted the NRCS in the initial stages of plan development. Members of the Fish and Wildlife Subcommittee of the NRCS State Technical Committee reviewed drafts and made substantive improvements to this action plan.

NRCS State Technical Committee, Fish and Wildlife Subcommittee:

United States Fish and Wildlife Service, Partners for Fish and Wildlife
United States Fish and Wildlife Service, Gulf of Maine Program
Maine Department of Inland Fish and Wildlife, Wildlife Division
Maine Department of Inland Fish and Wildlife, Fisheries Division
Maine Atlantic Salmon Commission
Maine Department of Conservation, Maine Forest Service
Maine Department of Conservation, Maine Natural Areas Program
Trout Unlimited
The Nature Conservancy

Local Work Groups:

Cumberland County, USDA Local Work Group
The Southwestern Maine Conservation Alliance, representing Oxford, Androscoggin, Cumberland, and York Counties
Aroostook County, USDA Local Work Group
Somerset County, USDA Local Work Group

NRCS works with the partners above, and many others, to deliver conservation that benefits Maine's fish and wildlife resources. Our partners express a continued interest to actively work with NRCS to implement USDA conservation programs for the benefit of these resources. NRCS will continue to expand its partner network with time. Multiple partners sent letters to NRCS in support of the objectives of this action plan. Click on the hyperlink below to view letters received.

Letters

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Appendix C. Exhibits

Additional information on NRCS or USDA conservation program and USDA grants can be found at the following website addresses.

Conservation Program Websites:

Maine Wildlife Habitat Incentives Program

http://www.me.nrcs.usda.gov/programs/WHIP.html

Maine Environmental Quality Incentives Program

http://www.me.nrcs.usda.gov/programs/2006EQIPApplicationInfo.html

Conservation Reserve Program

http://www.nrcs.usda.gov/programs/crp/

Wetlands Reserve Program

http://www.nrcs.usda.gov/programs/wrp/

Maine Grassland Reserve Program

http://www.me.nrcs.usda.gov/programs/GRP.html

Healthy Forest Reserve Program

http://www.nrcs.usda.gov/programs/HFRP/ProgInfo/HFRPProgramInfo.html

Farm and Ranch Lands Protection Program

http://www.nrcs.usda.gov/programs/frpp/

NRCS Grants Websites:

Conservation Innovative Grants

http://www.nrcs.usda.gov/programs/cig/

Cooperative Conservation Partnership Initiative

http://www.nrcs.usda.gov/programs/ccpi/index.html

Federal Grants Website

http://www.grants.gov/Index