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## **SECTION 7. WILDLIFE AND FISHERIES**

### **7.A Wildlife**

#### **7.A.1 Cover Type and Wildlife Habitat**

The composition, structure, and distribution of plant communities in an area constitute a large part of the cover and food components of wildlife habitat. As a result, areas with similar vegetative characteristics tend to have similar assemblages of wildlife species. Some wildlife species have very specific habitat requirements and are found in only a few habitats while other species have broader habitat requirements and are ubiquitous. This section briefly describes the major wildlife habitat types in the vicinity of Bangor Hydro-Electric Company's (BHE) proposed Northeast Reliability Interconnect (NRI) rights-of-way (ROW) and lists representative wildlife species that may occur in these habitats. Additional, more site-specific information on species occurring in these habitats is identified in Sections 7.A.2 and 7.A.3 and a more comprehensive list of wildlife species that may be found in each habitat is provided in Appendix 7-1.

Approximately 84 percent (70 miles) of the proposed 84.25 mile ROW is adjacent to existing, cleared electric transmission line ROW, gas pipeline ROW, and logging roads. There are three areas where the proposed route diverges from existing ROWs. The first and longest is approximately 13.5 miles in length, beginning just after the Blackman Stream crossing in Bradley and traveling cross country to a point where the route joins the Stud Mill Road and rejoins the Maritimes & Northeast Pipeline, LLC (Maritimes) ROW east of Sunkhaze Stream in Myra (T32 MD) (herein after the "Pickerel Pond Reroute"). This reroute is proposed to avoid potential visual impact to a section of the Sunkhaze Meadows National Wildlife Refuge and the Maine Youth Conservation Wildlife Management Area at Pickerel Pond and homeowner impacts along the Maritimes pipeline and Maine Electric Power Company (MEPCO) ROWs.

The second section of the route that deviates from existing ROW is located entirely within T32 MD near an area known as Myra, and is known as the "Myra Camp Reroute." This segment is

approximately one mile long, and is proposed to avoid several privately-owned camps near Crocker Turn Road.

The last segment of the route that does not parallel existing ROW is located at the end of the line in Baileyville. It is approximately 0.8 mile long, beginning east of the Maritimes Baileyville Compressor Station and Sprague Meadow Brook, and travels through recently harvested woodlands to the St. Croix River crossing. This section of virgin ROW is needed to make the NRI interconnection with the Canadian project.

Cover types along the proposed NRI ROW were interpreted from aerial photographs (scale: 1 inch = 200 feet) taken in the Fall of 2003 for the project Plan and Profile drawings (provided separately as Attachment 1 to this application). Determination of the various cover types was supplemented by field surveys conducted primarily in 2004 along the entire proposed route. Features such as major waterbodies and roads were located through review of the aerial photography and field notes.

The cover types along the proposed ROW can be classified into four broad categories: upland forest (coniferous and hardwood), early successional/clear-cut, wetland (forested, scrub-shrub, and emergent), and developed (residential, commercial and industrial). The predominant cover type is then used to define and describe the associated wildlife habitat. Natural cover types, such as upland forests and wetlands, are classified based on MNAP's *Natural Landscapes of Maine: A Classification of Ecosystems and Natural Communities* (MNAP 2004). The majority of the route can be characterized as forested and early successional/clear-cut habitats.

Descriptions of each of the four major cover/wildlife habitat types identified along the proposed route are provided in the following sections. Table 7-1, below, provides a summary of existing land use and the major cover/habitat types present along the area crossed by the ROW. Additional information related to potential wildlife habitat impacts is also presented. Site-specific information on Significant Wildlife Habitats and other sensitive habitat identified by the Maine Department of Inland Fisheries and Wildlife (MDIFW) is provided in Section 7.A.2.

**TABLE 7-1. WILDLIFE HABITAT SUMMARY**

<b>Existing Land Use (acres)</b>	<b>Cover/Habitat Type (acres)</b>	<b>Wetland Acreage within Maintained ROW (acres)</b>	<b>Conversion of Forested Habitat to Scrub/Shrub Habitat (acres)</b>
Utility Corridor: 41.63	Upland Forest: 686.46	Forested: 175.86	Wetland: 175.83
Comm. Forest: 1433.12	Early Success: 425.15	Scrub/Shrub: 117.03	Upland: 686.46
Urban <sup>1</sup> : 3.16	Wetland: 338.31	Emergent: 43.56	
Cropland/Pasture <sup>1</sup> : 23.65	Developed: 68.26	Unconsolidated Bottom: 1.86	
Shrub/brush Rangeland <sup>1</sup> : 16.62			

**Notes:**

<sup>1</sup> United States Geological Survey. 1990. Land Use and Land Cover Map Data.

**7.A.1.a Upland Forest**

The upland forest cover type is assumed to occur on lands that have a tree-crown areal density of at least 10 percent or more and are stocked with trees capable of producing timber or wood products (Anderson et al. 1976). Harvested areas, other than clear-cuts, from which trees have recently been removed to less than 10 percent but have not been developed for other purposes are also included. Approximately 45.2 percent of the project route consists of upland forest. The majority of upland forests adjacent to the proposed route are currently owned by corporations such as Kennebec West Forest, LLC (Kennebec West) (lands formerly owned by International Paper ([IP]), Gardner Land Company, H.C. Haynes, Wagner Forest Management (Wagner), and others. These forests are currently managed for production of commercial forest products.

The upland forest areas found along the route consist of the spruce-fir/northern hardwood forest ecosystem (MNAP 2004). In this ecosystem, conifer-dominated and hardwood-dominated forests intergrade into one another. The conifer forest communities are typically found in the lowlands and northern hardwoods communities are found on mid-elevation hillsides or ridges.

Hardwood dominated forest is fairly common along the proposed route. This cover type requires relatively good moisture conditions and richer soil conditions than the spruce-fir community and is typically found on the ridges and slopes along the route. Representative areas of this hardwood cover type exist on ridges and knolls east of The Horseback in Myra and are located sporadically along the route from Blackman Stream to Baileyville. These areas are dominated by American beech (*Fagus grandifolia*), sugar maple (*Acer saccharium*), red maple (*A. rubrum*), and yellow birch (*Betula alleghaniensis*). Balsam fir (*Abies balsamea*), eastern hemlock (*Tsuga canadensis*), and, to a lesser extent, northern red oak (*Quercus rubra*) are also common within this community. Although the canopy tends to be relatively dense, common understory shrubs include sugar maple, striped maple (*Acer. pensylvanicum*), hobblebush (*Viburnum alnifolium*), and balsam fir. The herbaceous layer, though typically sparse, consists of spinulose woodfern (*Dryopteris spinulosa*), bunchberry (*Cornus canadensis*), partridgeberry (*Mitchella repens*), and shining clubmoss (*Lycopodium lucidulum*).

Spruce-fir forests along the proposed route are generally located in lower elevation sites with relatively thin, poorly drained and acidic soil conditions. Balsam fir, red spruce (*Picea rubens*), and white spruce (*P. glauca*) are the dominant overstory trees. Common associates include white pine (*Pinus strobus*), eastern hemlock and red maple. The shrub layer predominantly consists of balsam fir. The sparse herbaceous layer consists of goldthread (*Coptis groenlandica*), wild sarsaparilla (*Aralia nudicaulis*), and Canada mayflower (*Maianthemum canadense*). Representative spruce-fir forests are located in the lower elevations throughout the Pickerel Pond Reroute and scattered intermittently along the entire route.

Because of the structural diversity found in the spruce-fir-northern hardwoods ecosystem, these areas tend to have a high diversity of wildlife species both in the understory and canopy. The herpetile (i.e., amphibians and reptiles) diversity in this habitat (especially the northern hardwood type) is greater than any other habitat type. Commonly found amphibian species include the redback salamander (*Plethodon cinereus*), spotted salamander (*Ambystoma maculatum*), wood frog (*Rana sylvatica*), gray treefrog (*Hyla versicolor*), and American toad (*Bufo americanus*). Reptile species that can occur include the northern redbelly snake (*Storeria occipitomaculata*) and eastern garter snake (*Thamnophis sirtalis*).

Bird species represented in the forested habitat include ground or shrub nesting species such as the ruffed grouse (*Bonasa umbellus*), winter wren (*Troglodytes troglodytes*), Swainson's thrush (*Catharus ustulatus*), ovenbird (*Seiurus aurocapillus*), and Canada warbler (*Wilsonia canadensis*). Cavity nesting birds typically include the black-capped chickadee (*Parus atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), and hairy woodpecker (*Picoides villosus*). Canopy/mid-story nesting birds include the golden-crowned kinglet (*Regulus satrapa*), blue-headed vireo (*Vireo solitarius*), American redstart (*Setophaga ruticilla*), and the black-throated green warbler (*Dendroica virens*). Raptor species encountered include the barred owl (*Strix varia*), broad-winged hawk (*Buteo platypterus*), and sharp-shinned hawk (*Accipiter striatus*). Avian species more frequently encountered in the spruce-fir forests include the spruce grouse (*Dendragapus canadensis*), raven (*Corvus corax*), red-breasted nuthatch (*Sitta canadensis*), bay-breasted warbler (*Dendroica castanea*), red crossbill (*Loxia curvirostra*), and evening grosbeak (*Coccothraustes vespertinus*).

The white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), black bear (*Ursus americanus*), and fisher (*Martes pennanti*) are common mammal species along the route. Other representative mammal species include southern red-backed vole (*Clethrionomys gapperi*), deer mouse (*Peromyscus maniculatus*), red squirrel (*Tamiasciurus hudsonicus*), porcupine (*Erethizon dorsatum*), and snowshoe hare (*Lepus americanus*).

#### **7.A.1.b Early Successional/Clear-cut**

This cover type classification includes upland areas that are in transition from cleared areas back to forest. These areas typically were mature forests before being cut. Also included are cover types within maintained utility corridors (Anderson et al. 1976). Approximately 28.0 percent of the proposed project route consists of early successional/clear-cut cover type. Typically, the vegetational composition and structure associated with this classification gradually changes over time due to natural succession. In the case of maintained ROW, the early successional cover type is permanently maintained due to periodic cutting of trees and saplings within the transmission ROW. Depending on the maintenance schedule, the ROW is kept in a stage ranging from herbaceous field to shrub dominated cover. The dominant shrubs within this cover

type include red raspberry (*Rubus idaeus*), sweet fern (*Comptonia peregrina*), and sheep laurel (*Kalmia angustifolia*). Bracken fern (*Pteridium aquilinum*), wintergreen (*Gaultheria procumbens*), hay-scented fern (*Dennstaedtia punctilobula*), gray goldenrod (*Solidago nemoralis*), and bunchberry are the common herbs. This is the cover type that would be maintained along the NRI route.

Due to the dense herbaceous and shrub vegetation that is typically located in early successional areas, ground nesting and shrub nesting species of birds are relatively common. These bird species include the chestnut-sided warbler (*D. pensylvanica*), Nashville warbler (*Vermivora ruficapilla*), common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*), indigo bunting (*Passerina cyanea*), and the white-throated sparrow (*Zonotrichia albicollis*). The red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*) are also commonly observed in these habitats.

Herpetiles, though less frequently encountered in these exposed areas, consist of redback salamander, American toad, and eastern garter snake. The lower moisture content and the comparatively high ground temperatures limit many of the amphibian species such as the spotted salamander and wood frog.

Mammals frequently encountered in these areas include the edge-associated species such as the southern red-backed vole, meadow vole (*Microtus pennsylvanicus*), short-tailed shrew (*Blarina brevicauda*), ermine (*Mustela erminea*), and coyote (*Canis latrans*). White-tailed deer and moose also frequent these habitats for foraging and bedding opportunities.

#### **7.A.1.c Wetlands**

Many palustrine wetlands exist within the proposed route. The vast majority of these include the forested, scrub-shrub, and emergent wetland cover types. As shown in Table 7-1, a very small fraction of the wetlands identified along the proposed ROW fall within a fourth wetland type: palustrine unconsolidated bottom wetlands. These wetlands consist primarily of open water with less than 30 percent vegetative cover. Appendix 11-6 in Section 11, Soils lists all of the

wetlands traversed by the proposed route. Provided below is a discussion of each of the three major wetland types that have been mapped along the route.

### **Forested Wetlands**

Forested wetlands are characterized by woody vegetation that is at least six meters tall (Cowardin et al. 1979). Forested wetlands are the most common wetland type found along the proposed route, encompassing approximately 52 percent of the total wetland acreage crossed. Forested wetlands make up approximately 11.6 percent of the entire proposed ROW. Most of these are classified as broad-leaved deciduous and/or needle-leaved evergreen forested wetlands. Examples of this wetland type occur at Birch Stream in T 32 MD, Main Stream in Great Pond, Fifth Machias Lake in T 35 MD, and along many small, unnamed perennial streams. Common tree species include red maple, white pine, yellow birch, eastern hemlock, American elm (*Ulmus americana*), tamarack (*Larix laricina*), northern white cedar (*Thuja occidentalis*), and black spruce (*Picea mariana*). Common shrub species include highbush blueberry (*Vaccinium corymbosum*), northern arrowwood (*Viburnum recognitum*), common winterberry (*Ilex verticillata*), and silky dogwood (*Cornus amomum*). Herbaceous species common to forested wetlands include sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), skunk cabbage (*Symplocarpus foetidus*), spotted jewelweed (*Impatiens capensis*), and sphagnum mosses (*Sphagnum* spp).

A number of mammal species utilize forested wetland habitat. Examples include moose, white-tailed deer, snowshoe hare, mink (*Mustela vison*), black bear, raccoon (*Procyon lotor*), bobcat (*Felis rufus*), beaver (*Castor canadensis*), and woodland jumping mouse (*Napaeozapus insignis*). In addition, herpetiles such as the wood frog, spotted salamander, blue-spotted salamander (*Ambystoma laterale*), northern spring peeper (*Pseudacris crucifer*), American toad, and eastern garter snake use forested wetland habitat for breeding, cover, and/or foraging. Bird species known to utilize forested wetland habitat include wood duck (*Aix sponsa*), pileated woodpecker (*Dryocopus pileatus*), northern waterthrush (*Seiurus noveboracensis*), northern parula warbler (*Parula americana*), and Canada warbler.

**Scrub-Shrub Wetlands**

Scrub-shrub wetlands are characterized by woody vegetation less than 6 meters tall (Cowardin et al. 1979). These areas are typically dominated by shrubs and young trees, but may also include older trees that are stunted due to environmental conditions. Scrub-shrub wetlands within the proposed project corridor occur as three general types; scrub-shrub wetlands associated with small streams, scrub-shrub wetlands associated with large streams, and peatland bogs. Approximately 35 percent of the total wetland acreage within the proposed project corridor consists of the scrub-shrub wetland cover type. Approximately 7.7 percent of the entire route is scrub-shrub wetland.

Many of the scrub-shrub wetlands associated with small streams have historically been altered by beaver, and many are currently occupied by beaver (as documented through field investigations). Dams constructed by beavers raise water levels that can inundate roots and subsequently kill many of the shrubs. Many of these active beaver dams are eventually abandoned, resulting in deterioration of the dams and subsequent draining of the impoundments. Dewatered areas are rapidly colonized by grasses, sedges, herbs, and shrubs. This type of scrub-shrub wetland is common within the proposed corridor, especially along Stud Mill Road where culverts facilitate the creation of dams by beaver. Examples of this wetland type occur at Little Birch Stream in Bradley, Wiley Brook in T 32 MD, Hinckley Brook in Great Pond, an unnamed tributary to Lower Sabao Lake, and Scott Brook in No. 21 Township.

A second type of scrub-shrub wetland occurs along the larger streams traversed by the proposed project corridor. Rather than being influenced by beaver activity, these areas are maintained by annual springtime inundations and/or groundwater discharge. Examples of this type of wetland occur at Great Works Stream in Bradley, Sunkhaze Stream in T 32 MD, Narraguagus River in T 34 MD, Machias River in T 37 MD BPP, Clifford Stream in T 27 EDD BPP, and Huntley Brook in No. 21 Township.

The third type of scrub-shrub wetland that occurs within the proposed project corridor is the peatland bog. The substrate is composed of sphagnum moss and species diversity of the plant community is limited by high acidity. As a result, the shrub layer is typically composed of acid-

tolerant shrubs and trees. Peatland bogs within or near the proposed project corridor occur at Jimmie's Pond eskers in T 34 MD, Haycock Pond in T 34 MD, a raised heath located along the Narraguagus River in T 34 MD, a raised heath in Baileyville, and the oxbow and Sawtelle Heath in Baileyville. Other significant peatlands occur throughout the general project area, including Sunkhaze Meadows, along the Horseback in T 32 MD (along Birch Stream on the west side, and Dollar Pond on the east), and near the west end of Great Pond.

Within the proposed project area, shrub and tree species common to scrub-shrub wetlands associated with small and large streams include common elderberry (*Sambucus canadensis*), northern wild raisin (*Viburnum cassinoides*), northern arrowwood, red osier dogwood (*Cornus stolonifera*), common winterberry, speckled alder (*Alnus incana*), broad-leaved meadowsweet (*Spiraea latifolia*), willows (*Salix* spp), highbush blueberry, and red maple. Herbaceous species include sensitive fern, cinnamon fern, skunk cabbage, spotted jewelweed, and sedges (*Carex* spp). The peatland bogs within the proposed project area are dominated by plants adapted to the cold environment and saturated, acidic, and nutrient poor substrates. These plant species include black spruce, tamarack, northern white cedar, cranberry (*Vaccinium macrocarpon*), leatherleaf (*Chamaedaphne calyculata*), Labrador tea (*Ledum groenlandicum*), sphagnum mosses, round-leaved sundew (*Drosera rotundifolia*), and pitcher plant (*Sarracenia purpurea*).

Scrub-shrub wetlands are structurally similar to early successional habitats. However, they generally have a greater diversity and abundance of wildlife species due to the seasonal presence of water. Scrub-shrub wetlands, especially those with inundated depressions, provide breeding habitat and cover for herpetiles including wood frog, American toad, gray treefrog, spring peeper, and eastern garter snake. Bird species known to inhabit these areas include woodcock (*Scolopax minor*), alder flycatcher (*Empidonax alnorum*), olive-sided flycatcher (*Contopus virens*), yellow warbler (*Dendroica petchia*), common yellowthroat, song sparrow, and red-winged blackbird (*Agelaius phoeniceus*).

Small mammals are generally abundant in scrub-shrub wetlands due to the thick understory and ground cover. Mammal species that are common to this wetland type include beaver, muskrat (*Ondatra zibethicus*), mink, masked shrew (*Sorex cinereus*), water shrew (*Sorex palustris*),

snowshoe hare, meadow vole, and southern red-backed vole. Other mammals that utilize that habitat type include moose, white-tailed deer, and raccoon. Insectivorous species such as masked shrew and water shrew are often abundant in bogs.

### **Emergent Wetlands**

Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens (Cowardin et al. 1979). Emergent wetlands include areas commonly referred to as marshes and wet meadows. The proposed project route crosses very few areas that could be classified solely as emergent wetlands because they are often associated with scrub-shrub wetlands. Approximately 13 percent of the total wetland acreage within the proposed transmission line corridor consists of the emergent wetland cover type. Approximately 2.9 percent of the total acreage within the proposed ROW consists of emergent wetlands. One of the largest emergent wetlands crossed occurs at Felts Brook in Brewer, which is already crossed by the existing MEPCO 345 kilovolt (kV) line.

Beaver activity often results in the development of extensive emergent wetlands that form in flooded areas. Muskrat are also common in shallow and deepwater marshes and feed on the abundant emergent vegetation. Other mammals that utilize emergent wetland habitat include little brown myotis (*Myotis lucifugus*), raccoon, mink, and white-tailed deer. Herpetiles common to emergent wetlands include northern spring peeper, pickerel frog (*Rana palustris*), green frog (*R. clamitans*), eastern garter snake, and painted turtle (*Chrysemys picta*). Bird species that are frequently observed in emergent wetlands include great blue heron (*Ardea herodias*), American black duck (*Anas rubripes*), red-winged blackbird, tree swallow (*Tachycineta bicolor*), yellow warbler, and swamp sparrow (*Melospiza georgiana*).

#### ***7.A.1.d Developed Areas - Residential, Commercial, and Industrial***

Much of the land located along the proposed route is undeveloped, particularly the area east of the existing MEPCO 345 kV line. The cities of Bangor and Brewer have the largest concentration of developed area, which is made up of residential, commercial, and industrial facilities. Less densely developed areas occur in communities north of Bangor along the

Penobscot River and I-95 corridor. Industrial development is primarily forest products businesses. Some commercial development is located within the small towns located adjacent to the proposed route and is generally associated with services for local communities, the timber industry, and recreational activities.

Residential areas along the proposed route are primarily restricted to areas near road crossings from Orrington north along the existing MEPCO transmission line up to Blackman Stream. Because vegetation composition and structural diversity is generally reduced in these areas, only those species that are habitat-generalists or adapted to this type of habitat tend to be present. Herpetile species that may be found in these areas can include the eastern garter snake and American toad. The house sparrow (*Passer domesticus*), mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), song sparrow, and black-capped chickadee (*Poecile atricapilla*) are frequently observed avian species. Mammal species found in this community type are typically habitat-generalists, and include the white-tailed deer, striped skunk (*Mephitis mephitis*), ground hog (*Marmota monax*), and coyote.

### 7.A.2 Significant or Sensitive Wildlife Habitats

Significant or sensitive wildlife habitat is protected by both state and federal law. BHE consulted with the MDIFW, the U. S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NOAA Fisheries) to identify significant or sensitive wildlife habitats in or near the proposed project route. MDIFW supplied BHE with Geographic Information System (GIS) data within one-mile of the proposed route. This data included Biological Conservation Database (BCD) point, buffer, and polygon data; Deer Wintering Areas (DWAs), Waterfowl and Wading Bird Habitat (WWH) polygons, and Eagle Nesting Sites with ¼-mile buffers. Discussion of the federal and state law and agency consultations follow. Copies of all correspondence with USFWS, NOAA Fisheries, the Atlantic Salmon Commission (ASC), and MDIFW are provided in Appendix 7-2. The Significant Wildlife Habitat Maps created from the MDIFW GIS data are included as Appendix 7-3.

### **7.A.2.a Federal Law**

#### **The Endangered Species Act**

The Endangered Species Act, 16 U.S.C. § 1531 et seq. (ESA), is the major federal law that is relevant to the proposed project. The ESA's primary aim is the protection of wildlife habitat. The USFWS and NOAA Fisheries are the federal agencies that are responsible for administering the ESA. Typically, the USFWS is the lead agency in issues dealing with wildlife species and habitat, while NOAA Fisheries often takes the lead with marine fish species and habitat.

Consultation with the USFWS identified three species listed or identified as a species of concern under the federal ESA that are found in vicinity of the proposed route: the bald eagle (*Haliaeetus leucocephalus*), Atlantic salmon (*Salmo salar*), and brook floater mussel (*Alasmidonta varicose*). NOAA Fisheries also identified the Atlantic salmon and shortnose sturgeon (*Acipenser brevirostrum*).

The bald eagle is federally-listed as threatened. In addition to protections afforded by the ESA, bald eagles and their nests are also protected by the Bald Eagle Protection Act, 16 U.S.C. §§ 668-668d. The USFWS states that the proposed route does not impact any bald eagle nest sites (see USFWS letter dated December 29, 2004 in Appendix 7-2). However, BHE and the USFWS recognize that there is breeding and foraging habitat for the bald eagles in the vicinity of the proposed route. A discussion of the presence of bald eagles and the brook floater and associated habitat protection in Maine is provided in subsections 7.A.2.b, 7.A.2.c, 7.A.4.a and 7.A.4.e. Atlantic salmon and shortnose sturgeon are discussed in Section 7.B Fisheries.

The USFWS also identified the potential presence of one state-listed species, the sedge wren, near Great Works Stream in Bradley. Information regarding the sedge wren is included in subsections 7.A.2.b and 7.A.4.b.

#### **The Magnuson Stevens Fishery Management and Conservation Act**

NOAA Fisheries provided a list of several streams in five watersheds that are crossed by the proposed ROW that are designated Essential Fish Habitat (EFH) for the Atlantic salmon under

the Magnuson Stevens Fishery Management and Conservation Act (MSA) (see NOAA Fisheries letter dated January 21, 2005, Appendix 7-2). A discussion of the MSA and EFH for Atlantic salmon is provided in Section 7.B.

### **The Fish and Wildlife Coordination Act**

NOAA Fisheries also indicated the proposed route may affect potential habitat for three fish species that are regulated under the Fish and Wildlife Coordination Act (FWCA): the American eel, alewife, and blueback herring. A discussion of the FWCA and potential presence of habitat for these three species is also provided in Section 7.B.

#### ***7.A.2.b State Law***

### **The Natural Resources Protection Act**

Pursuant to state law, significant wildlife habitat in Maine is protected under the Natural Resources Protection Act (NRPA), 38 M.R.S.A. § 480-A, et seq. The NRPA is administered by the Maine Department of Environmental Protection (MDEP).

The NRPA recognizes the state-wide significance of natural resources in terms of educational, historical, and environmental value to present and future generations. The intent of the NRPA is to prevent any unreasonable impact, degradation, or destruction of natural resources and encourages their protection and enhancement. The NRPA protects natural resources such as: coastal wetlands and sand dunes; freshwater wetlands; great ponds; rivers, streams and brooks; fragile mountain areas; and significant wildlife habitat. Significant Wildlife Habitat, as defined by the NRPA, is identified and mapped by the MDIFW. Significant Wildlife Habitat, to the extent that it has been mapped by MDIFW, includes:

- Habitats for state and federally listed endangered and threatened species;
- High and moderate value DWAs and travel corridors;
- High and moderate value WWH, including nesting and feeding areas;
- Critical spawning and nursery areas for Atlantic salmon (as defined by the Atlantic Salmon Commission);

- Shorebird nesting, feeding, and staging areas;
- Seabird nesting islands; and
- Significant vernal pools.

### **The Maine Endangered Species Act**

An additional protection for wildlife habitat is the Maine Endangered Species Act (Maine ESA), 12 M.R.S.A Ch. 713 subchapter 5, which is administered by the MDIFW.

The Maine ESA also has provisions that provide for protection of habitat of state-listed endangered and threatened species. The Maine ESA gives authority to MDIFW to designate species as endangered or threatened, designate “Essential Habitat” for those listed species, develop guidelines for the protection of these species, and establish programs that are necessary for the conservation of any endangered or threatened species. These programs may include acquisition of land/habitat, propagation, live trapping, and/or transplantation. The statute also prohibits the import, export, harassment, hunting, take, trapping, or possession of state-listed species. MDIFW may allow an incidental take of listed-species as long as the take is incident to and not the purpose of carrying out an otherwise lawful activity, the take will not impair the recovery of the species, and an incidental take plan is approved by the commissioner.

Based on the information received from federal and state agencies, possible significant or sensitive habitats regulated under the NRPA and Maine ESA that may be present along the proposed route consist of five major categories of habitats/areas:

- Bald Eagle Essential Habitat;
- Sedge Wren Habitat;
- DWAs;
- WWH; and
- Rare Mussel Habitat.

### **Bald Eagle Essential Habitat**

The bald eagle is currently listed as a threatened species under both the federal ESA and the Maine ESA. Maine has the only substantial population of bald eagles in the northeastern U.S. Maine's bald eagle population continues to grow, and annual increases in the census of nesting pairs on average has increased 8 percent each year since 1990, when Essential Habitat regulations were adopted in Maine (MDIFW 2004).

Based on existing information from the 2004 MDIFW endangered species database, several bald eagle nests have been identified in proximity to the proposed project, as shown on the Significant Wildlife Habitat mapping in Appendix 7-3. The areas within ¼ mile of these sites have been designated as Bald Eagle Essential Habitat. However, the project construction area does not cross any of these known Bald Eagle Essential Habitat areas. In accordance with previous consultations with MDIFW and as recommended by the USFWS, BHE will perform an aerial survey of the proposed route in the spring of 2005 and/or 2006 to identify any new bald eagle nests that may be established within ¼ mile of the corridor. The MDIFW and the USFWS will be consulted regarding the design and extent of the surveys and will be provided the results. Should new eagle nests be identified, BHE will consult with MDIFW and USFWS to determine appropriate mitigation for potential impacts.

Additionally, the USFWS noted that riverine corridors such as the Narraguagus, Machias and St. Croix Rivers may be used by bald eagles for perching, feeding and movement. They requested that construction of these corridors include raptor-friendly construction techniques. As discussed further in subsection 7.A.4., BHE will provide mitigation to reduce the potential for raptor and other avian species collisions with the power lines at these river crossings.

### **Sedge Wren Habitat**

The sedge wren (*Cisthorus platensis*) is a state-listed endangered species. It was formerly a widespread breeder in Maine, and was often found in breeding colonies. Recently only singing males have been observed sporadically at scattered localities in Kennebec, Penobscot, Washington, Somerset, Franklin, Sagadahoc, Lincoln, and Hancock Counties. The preferred breeding habitat is dense stands of sedges and grasses in wet meadows. The sedge wren has

been listed in Maine because of low population size, a declining population trend, and a population distribution at fewer than five discreet sites.

Correspondence received from the USFWS reported an occurrence the sedge wren at Great Works Stream in Bradley. BHE consulted with the MDIFW about this occurrence and it was determined that the location at which the sedge wren was observed in Bradley was more than one mile away from the NRI crossing of Great Works Stream. As a result, this occurrence of the sedge wren was not included in the GIS data received from MDIFW. It was also noted, however, that the sedge and grassy wet meadow habitat preferred by the sedge wren does extend to the proposed crossing location. Therefore, the potential for the sedge wren to be present in this portion of the project area can not be ruled out.

**7.A.2.c Significant Wildlife or Rare Species Habitats Crossed by the Proposed Route**

Based upon the review of GIS information received from MDIFW, 44 areas that are crossed by the proposed project route have been identified as Significant Wildlife Habitat: 42 are WWHs and two are DWAs. In addition, the brook floater mussel and associated rare mussel habitat occur at the Machias River crossing. Each of these categories is described below. Table 7-2 provides the locations of these areas along the proposed project route.

**TABLE 7-2. SIGNIFICANT WILDLIFE OR RARE SPECIES HABITATS ALONG ROUTE**

<b>Town</b>	<b>Habitat Type/Name</b>	<b>Value/Status</b>	<b>Acreage Impacted</b>	<b>Length of Crossing</b>
Brewer	WWH 13641/050340	high	10.07	~3513 ft.
Holden	WWH 13433	moderate	2.30	~982 ft.
Eddington	WWH 13060	moderate	2.83	~1020 ft.
Bradley	WWH 12718	moderate	5.66	~1954 ft.
Bradley	WWH 12642	moderate	6.72	~2350 ft.
Bradley	WWH 12445/110241	moderate	2.70	~695 ft.
Bradley	WWH 12239/110269	moderate	0.02	~80 ft.

**TABLE 7-2. SIGNIFICANT WILDLIFE OR RARE SPECIES  
HABITATS ALONG ROUTE**

<b>Town</b>	<b>Habitat Type/Name</b>	<b>Value/Status</b>	<b>Acreage Impacted</b>	<b>Length of Crossing</b>
Bradley	WWH 12239/110269	moderate	5.20	~1347 ft.
Bradley	WWH 12028	moderate	2.91	~752 ft.
Bradley	WWH 12061	high	7.40	~1988 ft.
Milford	WWH 12089	moderate	5.68	~1467 ft.
Bradley	WWH 12088	moderate	0.01	~110 ft.
Milford	WWH 12088	moderate	0.001	~55 ft.
T32 MD	WWH 12043	moderate	1.28	~379 ft.
T32 MD	WWH 11795	moderate	2.65	~681 ft.
T32 MD	WWH 11892	moderate	4.68	~1209 ft.
T32 MD	WWH 11679/111104	moderate	2.37	~616 ft.
T32 MD	WWH 11679/111104	moderate	0.96	~304 ft.
T32 MD	WWH 11679/111104	moderate	4.54	~1091 ft.
T32 MD	WWH 11679/111104	moderate	1.74	~456 ft.
T32 MD	WWH 11682	moderate	0.03	~450 ft.
T32 MD	WWH 11682	moderate	5.1	~1436 ft.
Great Pond PLT	DWA 040064	indeterminate	5.02	~1413 ft.
T34 MD	WWH 11569	moderate	3.85	~1085 ft.
T34 MD	WWH 11569	moderate	5.20	~1523 ft.
T34 MD	WWH 11569	moderate	2.25	~642 ft.
T35 MD	WWH 11569	moderate	3.94	~1124 ft.
T35 MD	WWH 11569	moderate	2.89	~819 ft.
T35 MD	WWH 11569	moderate	3.80	~1071 ft.
T35 MD	WWH 11569	moderate	2.17	~618 ft.
T35 MD	WWH 11658	moderate	2.55	~712 ft.
T35 MD	WWH 11635	moderate	0.12	~250 ft.
T35 MD	WWH 11541	high	1.38	~449 ft.
T35 MD	WWH 11093	moderate	1.46	~424 ft.

**TABLE 7-2. SIGNIFICANT WILDLIFE OR RARE SPECIES  
HABITATS ALONG ROUTE**

Town	Habitat Type/Name	Value/Status	Acreage Impacted	Length of Crossing
T36 MD BPP/ T37 MD BPP	WWH 11238	moderate	3.94	~1112 ft.
T36 MD BPP	WWH 11256	moderate	3.42	~1094 ft.
T37 MD BPP	WWH 11238	moderate	3.53	~996 ft.
T37 MD BPP	IMBIV02100*079*ME (rare mussel species) <sup>1</sup>	special concern	None	~ 500 ft.
No. 21 TWP	WWH 10517	moderate	2.21	~615 ft.
Princeton	WWH 9996/999	moderate	3.74	~1051 ft.
Princeton	WWH 9881	moderate	2.54	~755 ft.
Princeton	WWH 9792	moderate	4.65	~1191 ft.
Princeton	WWH 9803	high	3.00	~849 ft.
Baileyville	DWA 040454	indeterminate	2.26	~ 659 ft.
Baileyville	WWH 9765	moderate	3.42	~967 ft.

<sup>1</sup> Denotes the occurrence of the brook floater mussel and associated habitat, but is not considered Significant Wildlife Habitat under the NRPA.

**Deer Wintering Areas**

During winter, deer in northern climates often subsist on limited quantities of low quality foods, while simultaneously coping with low temperatures, chilling winds, and high energy requirements to stay warm (MDIFW 1990). In Maine, the preferred winter cover for deer is found in stands of red spruce and hemlock, which provide optimum cover and snow carrying capacity. These areas are critical for the survival of deer during the snowy cold winters of interior Maine.

MDIFW is responsible for identifying and protecting deer wintering areas. DWAs are identified by MDIFW personnel by observation of deer congregation, deer tracks, current or past browsing, pellet piles, and bedding sites (Title 12 § 10107). The DWAs assessed by MDIFW are ranked as high, moderate, indeterminate, or low value based upon deer populations, shelter quality, browse availability, relationship to other DWAs, size, and access. Those DWAs that have been identified but have not been evaluated are classified as unknown.

The proposed transmission line crosses two deer wintering areas of indeterminate value (Table 7-2). DWA 040064 is found near the intersection of Main Stream and Alligator Stream in Great Pond Plantation and is approximately 226 acres in size. The proposed crossing would be located generally along the edge of the DWA and impacts approximately 5.02 acres of the DWA. The other DWA crossed by the project is DWA 040454 in Baileyville. The proposed route would impact approximately 2.26 acres of this 56.3-acre DWA.

### **Waterfowl and Wading Bird Habitats**

Waterfowl and wading birds are a diverse assemblage of species which make significant, but not exclusive use of wetland habitats. Waterfowl are defined in Maine statute as species of the family Anatidae, which includes ducks, geese, and mergansers. Wading birds are considered to include bitterns, herons, egrets, ibis, rails, coots, and moorhens (MDIFW 1990).

Waterfowl habitats can be divided seasonally into three categories: breeding habitats, migration and staging habitats, and wintering habitats (MDIFW 1990). Wading bird habitats consist of breeding, feeding, roosting, loafing, and migration stopover areas. Similar to DWAs, WWHs are ranked as high, moderate, indeterminate or low value based upon species use, dominant wetland type, diversity of wetland types, and habitat size. Those that have not been evaluated are classified as unknown.

MDIFW has designated 42 WWHs that are crossed by the proposed route (Table 7-2). Thirty-eight of these are ranked as moderate value and four are ranked as high value habitats.

### **Rare Mussel Habitat - Brook Floater**

One federal species of concern was identified by USFWS that occurs or could potentially occur along the proposed route. The brook floater mussel is also a state species of special concern that is known to occur in the Machias River in T37 MD BPP. The brook floater was last observed in the Machias River in September of 1997. The mussel is classified as S3 (state rank) and G3 (global rank).

The brook floater is found in streams and rivers of the Atlantic coastal region, from South Carolina to Nova Scotia and New Brunswick. In Maine it is known from nearly all of the rivers that historically supported runs of Atlantic salmon, including the St. George, Sheepscot, Marsh Stream, several rivers and streams in the Penobscot River watershed, and most Down East salmon rivers (McCollough et al. 1995). The brook floater inhabits flowing-water habitats from small streams to large rivers. It is found in a range of flow conditions, but does not inhabit high-gradient streams with very fast water flow and coarse substrate (cobble and boulders), nor is it usually found in slow water. In general, it is thought to prefer stable habitats such as coarse sand and gravel. In Maine, it is often found in association with rooted aquatic vegetation. It is frequently found in streams that have low calcium levels and are nutrient-poor, a trait shared with some other members of the genus *Alasmidonta* as well as the eastern pearshell (McCollough et al. 1995).

### 7.A.3 Impacts and Effects on Habitats and Associated Wildlife

The construction and maintenance of the proposed transmission line will have both permanent and temporary effects on the existing habitats and associated ecological communities. Permanent effects result primarily from the conversion of forested habitat to emergent and scrub shrub habitat. Temporary effects can include minor changes in existing habitats due to removal of taller, woody vegetation and temporary ground disturbance during construction, and the short-term effect of ongoing construction activity on wildlife species that may cause them to leave the immediate area until construction activities cease.

#### **7.A.3.a Permanent Vegetation and Habitat Impacts**

Construction and long-term maintenance of the project will convert approximately 686.46 acres of upland forest to shrub or herbaceous covers. In addition, approximately 175.83 acres of forested wetland will be converted to a scrub-shrub cover type. Although 43.53 acres of emergent wetland and 116.95 acres of scrub-shrub wetland are located within the proposed ROW, minimal clearing impacts will occur to these wetlands. There will be essentially no impact to the very small amount of unconsolidated bottom wetlands present (1.66 acres) because they are primarily

open water and the limited amount of vegetation present will be unaffected by clearing or ROW maintenance. Table 7-1 provides a summary of projected permanent impacts on wildlife habitat.

Permanent habitat effects will result from unavoidable conversion of forested cover types to shrub or herbaceous types due to initial clearing and periodic maintenance of the vegetation in these newly cleared areas in an early successional stage throughout the life of the project. It is expected that herbaceous and small woody plants such as meadowsweet, alder, viburnum species, goldenrod species (*Solidago* spp.), asters (*Aster* spp.), raspberries and blackberries (*Rubus* spp.), and several grass species (*Gramineae*) will dominate the ROW. This long-term conversion of forested cover types to shrub or herbaceous types can offer certain benefits to some wildlife species, including succulent grasses and flowering plants for grazing animals, the production of more fruit for wildlife consumption from berry producing species, and the direct benefits of food, cover and nesting sites for species dependant on early successional habitats.

Maintained ROW's can provide habitat for early successional species such as chesnut-sided warbler (*Dendroica pensylvanica*), yellow warbler, common yellowthroat, alder flycatcher (*Empidonax alnorum*), eastern kingbird (*Tyrannus tyrannus*), song sparrow, and indigo bunting (*Passerina cyanea*). Wide-ranging habitat-generalist species such as coyote and red fox (*Vulpes vulpes*) may use the ROW as travel corridors. In addition, maintained utility ROW's are also used for foraging by several important game species such as white-tailed deer, moose, black bear, and wild turkey (*Meleagris gallopavo*). On the other hand, white-tailed deer, which take advantage of the cover during harsh winter months, could be affected by the loss of canopy if the deer wintering area were bifurcated. This could in turn affect the region's capacity by effectively isolating the now separate areas. As such, the ROW was sited to traverse the edge of the two deer wintering areas affected by the project. Impacts to forested wetlands may be somewhat greater than to other wetlands, as the loss of tree canopy may locally alter the plant communities and affect wildlife. Many year-round native bird species are most abundant in coniferous swamps during winter.

Impacts to scrub-shrub and emergent wetlands will be less than forested wetlands, because the vegetation is low and need not be cut. In areas where vegetation is cleared, for example alders,

the light and water regimes are such that regeneration will consist of species identical with those already growing. Many of these wetlands are fringes along streams, where buffer zones and judicious structure placement on nearby upland will allow the conductors to easily span the wetland area without any impact to the wetlands and riparian vegetation. Within all affected wetland habitat, the entire ROW will be maintained in the emergent or scrub-shrub wetland type. Because the hydrology of the wetlands along the project route will not be altered (i.e., no inflow/outflow restrictions), no permanent impact to the principal functions such as groundwater discharge or sediment stabilization are expected.

### **Mammalian Impacts**

It is anticipated that mammals in the general area will not be adversely affected by the proposed transmission line. With initial clearing of the project route and construction of the line, larger mammals will likely be displaced to adjacent forest habitats. The original or historic carrying capacity of these habitats has previously been altered by the forest management practices in use for many years, resulting in a patchwork, dynamic forest. The cleared ROW will be similar in nature and aspect to the transitory clearcuts and adjacent, cleared ROWs that are such a prominent feature of the environment in this region of Maine. Shifting patterns of vegetation in the cleared ROW will likely result in small changes in mammal populations which will stabilize over time.

The following benefits will likely occur as a result of constructing the proposed transmission line:

- Populations of most small mammals will increase, likely benefiting predators and the upper food chain;
- Increased mobility for some larger mammals, including hares, deer, moose, and bear, which at times may prefer to travel along the edge of the ROW will benefit those species;
- Long-term changes in vegetation in the ROW, which will increase graminoid food resources, may benefit deer, turkeys, woodchucks, and hares; and
- Improved balance of early successional habitat in the overall landscape.

### **Avian Impacts**

The greatest impacts to bird populations from the project will result from the permanent conversion of forest land to open land in the proposed ROW. The effective loss of forest diminishes the available habitat for tree-dependent species. Cavity-nesters such as hairy woodpecker, downy woodpecker, pileated woodpecker, black-capped chickadee, red-breasted nuthatch, and brown creeper will likely be impacted. Populations of these species will be displaced to forests adjacent to the project ROW where suitable nest sites and areas for foraging occur. In addition, these species are among the most common native residents, with large healthy populations.

Other species, dependent on suitable cover, although not cavity-nesters, will also be displaced. Red-eyed vireo, ovenbird, rose-breasted grosbeak (*Pheucticus ludovicianus*), scarlet tanager (*Piranga olivacea*), redstart, chestnut-sided warbler, and other migrant species which are forest nesters will move to adjacent habitat.

Many bird species will benefit from the increased open area and from the creation of edge habitats, especially in upland areas. Among these may be included white-throated sparrow, chestnut-sided warbler, redstart, chipping sparrow (*Spizella passerine*), ruby-throated hummingbird (*Archilochus colubris*), gray catbird (*Dumetella carolinensis*), and purple finch (*Carpodacus purpureus*). These species nest in brushy areas that will occur along the edges of the ROW. Wetland dependent songbirds, including common yellowthroat, red-winged blackbird, song sparrow, and yellow-rumped warbler (*Dendroica coronata*) will also benefit from cover left in the buffer zones along the streams. It is likely they will increase in other wetland areas due to the creation of the ecotone (i.e., edge) habitat. One concern, however, is that brown-headed cowbird, a species preferring open land, will increase at the expense of wood warblers. Cowbirds parasitize wood warbler nests, causing failure of the brood.

Recent studies of northeastern raptors have shown that habitat diversity is well tolerated by most species. Brooks (1989) concludes that “a landscape of interspersed forest and open-habitat types would best support the majority of raptor species.” In this study of the amount of ecotone habitat in the northeast, he also concludes that Maine “has the least diverse landscape of the eight states

for which data are available.” Forest openings are used for hunting and foraging, and may provide greater prey base than contiguous forests.

Among raptors most likely to benefit from increased opening of the forest is the broad-winged hawk (Titus and Mosher 1981), already the most abundant raptor in the project area. Kestrels, also abundant throughout, will likely benefit from increased hunting opportunities, and may nest on the ROW edge. Other forest-dwelling raptors, including red-tailed hawks, great horned owl, and long-eared owl should also benefit from increased diversity. One species, the northern harrier, a ground nester limited to open wetland areas, may benefit from increased habitat.

Only northern goshawks, red-shouldered hawks and barred owls have been identified as raptors that require large, remote forest tracts (Falk and Stauffer 1989; Speiser 1989). These species were confirmed breeders in approximately 20 percent of survey blocks in the project area (Adamus 1987). It is probable that the project will have some negative impact on populations of these species.

The removal of trees from the ROW may decrease nesting opportunities for raptors, although no nest sites were observed on the ROW during field work. The likelihood of ospreys utilizing transmission towers for nest sites may be assessed in comparison with the existing MEPCO line, where a number of towers were colonized as observed during field work conducted previously for the NRI. Most existing sites along the MEPCO line were observed at streams. Similar situations will likely occur along the proposed power line.

### **Bird Collisions with Power Lines**

Another potential impact on bird populations could result from collisions with the conductors or shield wire. Bird mortality associated with electric transmission lines has been extensively studied and bird mortality rates appear to be influenced by the location of the transmission line (i.e., lines located near bird concentration areas or along migration routes result in greater mortality), the species of bird (physical features), and visibility conditions (low light/fog). Thomspson (1978) concludes that “the most consistent victims of wire strikes are large migratory water birds” and that “raptors, due to their great visual acuity, are rarely victims of wire strikes.”

Crowder and Rhodes (2002) found that species of birds that are at greatest risk for collision are those that show a high wing loading and low wing aspect ratio. NUS Corporation (1979) reviewed studies of bird interactions with power lines and also concluded that species with larger appendages (necks and legs) collided more often with power lines. Examples of such species include cormorants, coots, ducks, swans, herons, and doves.

Many human structures and activities, including electric transmission lines, can cause mortality among birds. However, available statistics indicate the overall estimated mortality due strictly to high voltage electric transmission line strikes by birds is below that associated with other structures and activities such as building window strikes, communication tower strikes, cars, pesticides, and cats (USFWS 2002). Kroodsma (1978) suggests that avian mortality due to larger transmission lines (such as the NRI transmission line) should be distinguished from mortality rates from collisions with smaller distribution lines and concludes that “deaths caused by transmission lines would appear to have had no significant impact on waterfowl populations”.

Nevertheless, BHE is sensitive to this concern and is proposing to install markers at two crossings of high value WWH and at the Narraguagus, Machias and St. Croix River crossings to minimize the potential of collisions in these areas with concentrated avian activity. A number of different types of markers have been used with varying degrees of success (Bridges et al. 2004). Based on discussions with USFWS and MDIFW biologists, BHE proposes to install markers called “flappers” on the shield wires at these crossings. The flappers that are proposed for use utilize motion, reflectivity, and light emissions to alert birds of an upcoming obstruction. However, anything placed on a power line has a tendency to accumulate ice and snow in northern latitudes. The bigger the device placed on the line, the more weight this will add to the line. Therefore, ice- and wind-loading potential need to be evaluated before attaching anything to conductors or shield wires. Clamps that attach a device to the line may also slip and/or wear the wire, which may result in damage and failure of the wire. Corona discharge may also be associated with a device placed on a line, which can create noise, radio or television interference, create safety issues, or impede the flow of electricity (Bridges et al. 2004). Once these evaluations are completed, BHE will consult with the USFWS, MDIFW and MDEP to finalize the details of this mitigation measure to help prevent bird strikes.

In addition, colored aviation ball markers will be placed on the shield wires to increase their visibility to birds as well as aircraft. The ball markers will be placed on the transmission line crossing of the St. Croix, the Narraguagus, and the Machias Rivers, and Great Works Stream. Specific sizes and spacing of the aviation ball markers will be in accordance with Federal Aviation Administration (FAA) requirements and recommendations.

### **Consolidated Corridors Route**

It is important to note that by design, through the completion of an extensive evaluation of route alternatives that included the participation of a broad-based stakeholders group, the majority of the proposed route for the NRI project co-locates impacts with the adjacent, existing early successional ROW along the MEPCO and Maritimes pipeline, and along the Stud Mill Road. Co-locating the vegetation changes that result from the proposed NRI transmission line with existing cleared ROW and roads will minimize potential habitat fragmentation to the greatest extent practicable. Special procedures to minimize vegetation impacts from initial clearing, construction and follow-up ROW vegetation maintenance within waterbody and other buffers and the associated benefits to water quality, wildlife and fisheries are provided in Section 7.B.2, below; Section 10, Buffers; and the Northeast Reliability Project Post-Construction Vegetation Maintenance Plan (NRI Vegetation Maintenance Plan), located in Appendix 10-1.

#### ***7.A.3.b Temporary Effects***

Other impacts to wildlife habitat from construction of the project, such as temporary ground disturbance and the associated potential for erosion and sedimentation of wetlands and streams and temporary changes in vegetation, will be minimized by completing construction and ROW restoration activities in accordance with the Northeast Reliability Project Erosion and Sedimentation Control Plan (NRI E&S Plan or Plan), located in Section 14, Erosion and Sedimentation Control, Appendix 14-1. The long-term health of vegetation on the ROW and other components of wildlife habitat, such as water quality, will be enhanced by the procedures and restrictive measures for cutting of vegetation and herbicide use set forth in the NRI Vegetation Maintenance Plan (Appendix 10-1). Adherence to these measures to minimize the removal of vegetation, control and repair disturbed ground, protect riparian areas, and promote

the growth of vigorous, dense vegetative cover, in compliance with conductor clearance safety requirements, will ensure that these temporary impacts are localized and short-term in nature.

#### 7.A.4 Impacts and Effects on Significant or Sensitive Wildlife Habitats

##### ***7.A.4.a Bald Eagle Nest Sites***

The proposed construction corridor does not cross any known Bald Eagle Essential Habitat areas. As a result, no impacts are anticipated and no mitigation is currently proposed. BHE will perform an aerial survey of the proposed route in the spring of 2005 and/or 2006 to identify any new bald eagle nests that may be established within ¼ mile of the corridor. Should new eagle nests be identified, BHE will consult with MDIFW and USFWS to determine appropriate mitigation for potential impacts. Typically, disturbance to eagle nests is avoided by prohibiting construction activity within the Essential Habitat during the time of year when breeding and nesting activities occur (generally February 1 through May 15, continuing until August 31 if the nest is occupied).

As mentioned previously, pending completion of engineering evaluations to ensure that the integrity and reliability of the NRI transmission line will not be compromised, BHE is proposing to install flappers that utilize motion, reflectivity, and light emissions to alert birds of the presence of a power line or other obstructions. As recommended by the USFWS, the flappers will be installed at the power line crossings of the Narraguagus, St. Croix, and the Machias Rivers, and Great Works Stream because these riverine corridors are likely used by bald eagles for perching, feeding and movement. Flappers will also be installed at all high value WWH crossings along the route. Specific sizes, color and spacing of the flappers will be determined in accordance with the results of the engineering evaluation and recommendations by the State Non-Game Biologist. In addition, colored aviation ball markers will be placed on the shield wires at the transmission line crossings of the St. Croix, the Narraguagus, and the Machias Rivers and Great Works Stream to increase their visibility to eagles and other raptors and birds, as well as aircraft. Specific sizes and spacing of the aviation ball markers will be in accordance with Federal Aviation Administration (FAA) requirements.

#### ***7.A.4.b Sedge Wren Habitat***

There are no known occurrences of the sedge wren within over one mile of NRI project construction areas. Suitable sedge wren habitat (dense sedge and grass wet meadows) does occur at the Great Works Stream crossing in Bradley. However, no structures will be located within the sedges and grasses bordering Great Works Stream, and other construction or operation activities for the NRI transmission line will not require cutting or alteration of this habitat. Since no alteration of the amount or type of vegetation will be required in this potential sedge wren habitat, no impacts to the sedge wren are expected at the Great Works Stream crossing or elsewhere along the proposed route.

#### ***7.A.4.c Deer Wintering Areas***

The proposed transmission line crosses two deer wintering areas listed as indeterminate value. During BHE consultations with MDIFW regarding the need for mitigation of project impacts to these DWA areas, MDIFW has indicated that no mitigation is required as the project was sited to 'skirt' the edges of the two deer wintering areas. Vegetation maintenance during on-going operation of the NRI ROW will create a considerable amount of new browse habitat for deer.

#### ***7.A.4.d Waterfowl and Wading Bird Habitats***

MDIFW has designated 42 WWHs that are crossed by the proposed route. Forty of these are ranked as moderate value and two are ranked as high value habitats. WWHs are typically open water/floating leaved aquatic and emergent habitats that will not change as a result of project construction or operation. As determined through consultations with MDIFW, BHE is proposing to prohibit all clearing and construction activity, as well as follow-up routine vegetation maintenance in these WWH areas between April 15 and July 15 each year. The restriction on activity within the WWHs will minimize the potential disruption of avian breeding and nesting activity. MDIFW concurrence with this mitigation proposal is documented in the minutes of a meeting held with MDIFW biologists on January 20, 2005. The meeting minutes are located in Appendix 7-2.

In addition, because WWH areas are typically located within wetland areas, the use of herbicides for vegetation maintenance will be prohibited within most of the areas mapped as WWH (see the NRI Vegetation Maintenance Plan in Appendix 10-1). The NRI E&S Plan, located in Appendix 14-1, also contains additional measures to prevent erosion and sedimentation within all wetland areas on or adjacent to the ROW in general.

#### ***7.A.4.e Rare Mussel Habitat - Brook Floater***

The brook floater mussel is known to occur in the Machias River. However, no impacts to the brook floater are expected to result from construction or operation of the NRI project because no in-stream activities are required. The crossing of all streams will utilize existing crossings or temporary equipment crossings that span the streams. To avoid impacts to potential brook floater habitat (as well as other impacts on the Machias River), the existing Stud Mill Road bridge that spans the river at the NRI crossing will be used. Proposed restrictions on clearing prior to construction and ROW vegetation maintenance following construction will mitigate for potential affects on water quality or temperature, given that the Machias River is already exposed to direct sunlight in this area (see the NRI E&S Plan and the NRI Vegetation Maintenance Plan).

The NRI E&S Plan includes other measures to protect water quality from sedimentation and the NRI Vegetation Maintenance Plan includes a prohibition on the use of herbicides within at least 25 feet of the Machias River and its associated wetlands. The wetlands at the Machias River crossing extend out approximately 100 feet on the west side and 150 feet on the east side of the river.

## **7.B Fisheries**

### **7.B.1 Waterbody Crossings and Associated Fisheries**

The proposed NRI project will cross a total of 119 waterbodies consisting of two major crossings (over 100 feet in width) and 117 minor crossings. The two major waterbody crossings are Great

Works Stream in Bradley, and the St. Croix River/Woodland Flowage in Baileyville. The minor crossings include both perennial and intermittent waterbodies. A table titled “Waterbodies Crossed by the NRI Project,” which lists all waterbody crossings required for the project with pertinent name, location, size and water quality and fishery type classifications, is provided in Appendix 7-4.

Fishery types in these waterbodies have been characterized as coldwater, warmwater, coldwater/warmwater, or unknown, based on the primary fish species found in them and the management objectives for the stream as identified by the MDIFW. The most recognized species comprising coldwater fisheries are members of the family Salmonidae (trout and salmon). Coldwater species that may occur in the project area include brook trout (*Salvelinus fontinalis*) and Atlantic salmon. Brook trout are essentially ubiquitous in the project area and may be found in some portion of many of the waterbodies. Species that comprise warmwater fisheries include smallmouth bass (*Micropterus dolomieu*), chain pickerel (*Esox niger*), and sunfish (*Lepomis* spp.). For some waterbodies, the fishery is most accurately described as coldwater/warmwater because one classification does not predominate over the other. The “unknown” classification for some of the waterbodies results from a lack of specific knowledge by the resource management agencies. These lesser waterbodies have not been studied because there has been low priority for extending research to the large number of minor waterbodies in Maine considering the abundance of larger and more significant streams and lakes. Some of the minor crossings classified as unknown probably support brook trout, albeit they are likely small and/or seasonal populations. Intermittent waterbodies may provide only extremely short-term fishery habitat value, if any.

Table 7-3, provided on the following page, is a comprehensive listing of fish species potentially present in the waterbodies crossed by the NRI project.

**TABLE 7-3. LIST OF POTENTIAL FISH SPECIES IN THE PROJECT AREA**

Scientific Name	Common Name	Warmwater	Coldwater
<i>Anguilla rostrata</i> <sup>1</sup>	American eel	X	X
<i>Couesius plumbeus</i>	Lake chub	X	X
<i>Luxilus cornutus</i>	Common shiner	X	
<i>Notemigonus crysoleucas</i>	Golden shiner	X	
<i>Notropis hudsonius</i>	Spottail shiner	X	
<i>Phoxinus eos</i>	N. redbelly dace	X	X
<i>Rhinichthys atratulus</i>	Blacknose dace		X
<i>Rhinichthys cataractae</i>	Longnose dace		X
<i>Margariscus margarita</i>	Pearl dace	X	X
<i>Semotilus corporalis</i>	Fallfish		X
<i>Semotilus atromaculatus</i>	Creek chub		X
<i>Catostomus catostomus</i>	Longnose sucker		X
<i>Catostomus commersoni</i>	White sucker	X	X
<i>Erimyzon oblongus</i>	Creek chubsucker	X	
<i>Ameiurus nebulosus</i>	Brown bullhead	X	
<i>Salmo salar</i> <sup>1</sup>	Atlantic salmon		X
<i>Salvelinus fontinalis</i> <sup>1</sup>	Brook trout		X
<i>Osmerus mordax</i> <sup>1</sup>	Rainbow smelt		X
<i>Esox niger</i> <sup>1</sup>	Chain pickerel	X	
<i>Lota lota</i>	Burbot		X
<i>Cottus cognatus</i>	Slimy sculpin		X
<i>Morone americana</i> <sup>1</sup>	White perch	X	
<i>Micropterus dolomieu</i> <sup>1</sup>	Smallmouth bass	X	
<i>Lepomis auritus</i>	Redbreast sunfish	X	
<i>Lepomis gibbosus</i>	Pumpkinseed	X	
<i>Perca flavescens</i> <sup>1</sup>	Yellow Perch	X	
<sup>1</sup> Sport or commercial species			

**7.B.1.a Atlantic salmon**

Pursuant to the MSA, 16 U.S.C. § 1801 et seq., NOAA Fisheries, fishery management councils, along with other federal and state agencies and the fishing community are charged with identifying habitats essential to managed species, including the Atlantic salmon. These habitats are known as EFH. All waters currently or historically accessible to Atlantic salmon in New England have been designated as EFH for Atlantic salmon. NOAA Fisheries has identified numerous streams within five watersheds crossed by the proposed ROW that are considered EFH for Atlantic salmon. The MSA mandates that NOAA Fisheries coordinate with other federal agencies to avoid, minimize, mitigate, or otherwise offset effects on EFH that could result from federal actions or other proposed activities. NOAA Fisheries has indicated that an EFH assessment will be required during federal permitting of the project.

The Atlantic salmon is also federally-listed as endangered pursuant to the ESA, as the Gulf of Maine Distinct Population Segment of Atlantic salmon. The project will cross portions of three watersheds that fall within potential habitat for this Distinct Population Segment: the Narraguagus, Machias and East Machias River watersheds. The Atlantic salmon is jointly listed by the USFWS and NOAA Fisheries; however, the USFWS has lead agency status for ESA Section 7 consultations for those projects that occur within the freshwater habitat of Atlantic salmon.

Through consultation with USFWS, and the Maine Atlantic Salmon Commission (ASC), nine of the waterbodies crossed by the proposed route in the three watersheds are considered to be of “special environmental concern” with regard to providing potential habitat for Atlantic salmon (as identified on the project plan and profiles drawings as “ASC Water of Special Concern”). The consultation included a site visit to the areas of the route that cross the three watersheds. The nine waterbodies identified are the Narraguagus River, two unnamed tributaries to Fifth Machias Lake, an unnamed tributary to Fletcher Brook, the Machias River, Dead Stream, Lanpher Brook, Huntley Brook, and Joe Brook. Correspondence related to the fisheries consultations under the ESA are included in Appendix 7-2. Descriptions of each of these streams that may have the potential to provide “salmon habitat” follow.

**Narraguagus River (Project Survey Station 2218+80)**

The Narraguagus River is a perennial stream, approximately 50 feet wide at the location of the proposed crossing. The State Water Quality Class is AA and it is designated as a coldwater fishery. The Narraguagus River may contain small numbers of naturally-reproducing Atlantic salmon. Habitat at the location of the crossing is not considered prime habitat as it is slow flowing with sand and silt substrate. Juvenile and adult salmon may, however, move through this area. The banks are low and are vegetated primarily by grasses and shrubs.

**Tributary to Fifth Machias Lake (Project Survey Station 2270-15)**

This tributary to Fifth Machias Lake is a perennial stream approximately five feet wide at the location of the proposed crossing. The State Water Quality Class is A. The stream is considered coldwater fish habitat and contains potential juvenile (parr) Atlantic salmon habitat.

**Tributary to Fifth Machias Lake (Project Survey Station 2273+05)**

This tributary to Fifth Machias Lake is a perennial stream approximately five feet wide at the location of the proposed crossing. The State Water Quality Class A. The stream is considered coldwater fish habitat and has the potential to provide habitat for juvenile (parr) Atlantic salmon.

**Tributary to Fletcher Brook (Project Survey Station 2913+02)**

This tributary to Fletcher Brook is a perennial stream approximately four feet wide at the location of the proposed crossing. The State Water Quality Class is A. The fishery type for the stream is unknown. There is potential for this stream to provide habitat for juvenile (parr) Atlantic salmon present in the area of the proposed crossing.

**Machias River (Project Survey Station 2963+21)**

The Machias River is a perennial stream, approximately 72 feet wide at the location of the proposed crossing. The State Water Quality Class is AA, and it is considered to be a coldwater/warmwater fishery. The Machias River may contain small numbers of naturally-reproducing Atlantic salmon and is also actively stocked with Atlantic salmon. Salmon spawning and rearing habitat is located in the vicinity of the crossing location and this section of the river is important run habitat for adult salmon accessing upstream spawning habitat or for

smolts and adults as they migrate downstream to the ocean. The bottom substrate in this area is mostly gravel and sand. The banks are relatively steep and are vegetated with alders and red maples along the water and white pines higher on the banks. This segment of the Machias River is also on the National Rivers Inventory.

**Tributary to Dead Stream (Project Survey Station 3042+52)**

This tributary to Dead Stream is a perennial stream, approximately 3½ feet wide at the location of the proposed crossing. The State Water Quality Class is A. The stream is considered coldwater fish habitat, and has the potential to provide habitat for juvenile (parr) Atlantic salmon. Dead Stream is a tributary to First Lake, which is a headwater of Old Stream, a major tributary of the Machias River.

**Lanpher Brook (Project Survey Station 3113+39)**

Lanpher Brook is a perennial stream, approximately two feet wide at the location of the proposed transmission line crossing. The State Water Quality Class is A. The stream is considered coldwater fish habitat, and has the potential to provide habitat for juvenile (parr) Atlantic salmon. Lanpher Brook is a tributary to Third Lake, which is a headwater of Old Stream, a major tributary of the Machias River. The proposed transmission line crossing is 1.4 miles upstream from Third Lake.

**Huntley Brook (Project Survey Station 3702+97)**

Huntley Brook is a perennial stream, approximately 20 feet wide at the location of the proposed crossing. The State Water Quality Class is A. The stream is considered coldwater fish habitat, and has the potential to provide habitat for juvenile (parr) Atlantic salmon. Stream bottom substrate in this area is gravel/cobble. Huntley Brook is a tributary to Crawford Lake, which is approximately 4 miles downstream from the proposed crossing. The main stem of the East Machias River flows out of Crawford Lake.

**Joe Brook (Project Survey Station 3831+68)**

Joe Brook is a perennial stream, approximately 10 feet wide at the location of the proposed crossing. The State Water Quality Class is A. The stream is considered coldwater fish habitat,

and has the potential to provide habitat for juvenile (parr) Atlantic salmon. It is rocky with a boulder riffle, woody debris, and gravel/cobble substrate in the area of the proposed crossing. The proposed crossing is approximately 2.2 miles upstream from the confluence of Joe Brook with Allen Stream. Allen Stream flows into the Maine River. The Maine River is a major tributary to Crawford Lake. The East Machias River flows out of Crawford Lake.

### ***7.B.1.b Shortnose Sturgeon***

The shortnose sturgeon is also federally-listed as endangered pursuant to the ESA. The shortnose sturgeon is an anadromous fish that spawns in large coastal rivers along the east coast of North America from the St. John River in New Brunswick, Canada, to the St. Johns River in Florida. It prefers the nearshore marine, estuarine, and riverine habitat of large river systems. Shortnose sturgeon are found in the main stem of the Penobscot River. The proposed project does not cross the Penobscot River; therefore, no impacts to shortnose sturgeon or its habitat are anticipated from the construction or operation of the project. NOAA Fisheries concurred with this assessment reporting that shortnose sturgeon are not known to occur within the area affected by the proposed project.

### ***7.B.1.c Fish and Wildlife Coordination Act***

NOAA Fisheries reported that portions of the proposed route may affect habitat suitable for American eel, alewife, and blueback herring, particularly the areas near the Machias, Narraguagus, and St. Croix Rivers. These species are regulated under the FWCA, 16 U.S.C. §§ 661-667e. The statute requires federal agencies to take into consideration the effect that water-related projects would have on fish and wildlife resources, prevent loss or damage to these resources, and provide for the development and improvement of these resources. Typical actions that fall under the jurisdiction of the FWCA include:

- discharges of pollutants including industrial, mining, municipal wastes, dredging, and placing fill material into a water body or wetland; or

- projects involving construction of dams, levees, impoundments, stream relocation, and water-diversion structures.

If the proposed project is being constructed, licensed, or permitted by a federal agency and involves any of these activities or any activity resulting in the control or modification of any waterbody for any purpose, then the federal agency must consult with the USFWS and NMFS, and state fish and wildlife agency to develop measures to mitigate for project-related losses of fish and wildlife resources.

### 7.B.2 Impacts and Effects on Waterbodies and Associated Fisheries

Erosion and sedimentation during construction and locally increased stream insolation (exposure to sunlight) are typical impacts associated with the construction of utility corridors (Peterson 1993). Sedimentation can result in reduced light penetration, smothering of aquatic feeding and spawning areas, and impairment of aquatic respiration. Increased water temperature due to solar exposure can also pose problems for coldwater fisheries. Peterson (1993) has reported that the removal of tree canopy (on new ROWs) increases stream insolation during the short term, but within two years the areas are bordered by dense shrubs and emergent vegetation and water temperatures are not significantly greater when compared with upstream forested reaches.

To minimize any potential for negative impacts to stream habitat and fisheries, BHE is proposing a minimum 75-foot-wide buffer, as measured from the top of both banks, for all waterbodies crossed by the project that are not adjacent to the MEPCO line and a minimum 25-foot-wide buffer for all waterbodies crossed by the project that are adjacent to the MEPCO line. As described in greater detail in Section 10, Buffers, waterbody buffers will be wider than 25/75 feet where site-specific conditions allow for a wider buffer without undue hindrance to required maintenance activity or increasing the potential for disturbing soils or remaining vegetation in order to complete required vegetation maintenance. Clearing prior to construction and follow-up vegetation maintenance during operation within standard waterbody buffers will be restricted to the removal of “capable species” that are greater than 8 to 10 feet tall, dead or dying trees only. Capable species are defined as those plant species that are capable of growing tall enough to

reach within the required clearance between conductors and vegetation that is established by the New England Power Pool (NEPOOL) Vegetation Maintenance Standard. The NEPOOL Vegetation Maintenance Standard for the NRI transmission line requires 15 feet of clearance between vegetation and conductors. Compliance with the NEPOOL Vegetation Maintenance Standard within waterbody buffers will be achieved by maintaining the height of capable species at 8 to 10 feet, due to the sag in power lines and to allow for tree growth until the next maintenance cycle (typically 3-4 years for stream buffers). Removal of capable species, where required, will be conducted by hand cutting or reaching into the buffer with mechanized tree harvesting equipment located outside the buffer.

No other vegetation will be removed or disturbed within the stream buffers other than that necessary to install temporary equipment crossings, where needed. Otherwise, stream side vegetation will not be disturbed during construction or during future maintenance activities and the buffer will continue to function in a similar manner as before construction. No structures will be installed within the stream buffers and no work will take place within the stream channels. Existing access roads will be used to cross all streams to the extent practicable. If a temporary crossing is required, all crossings will span the stream channel. Appropriate erosion and sedimentation controls will be installed and maintained throughout construction to minimize the potential for sedimentation of waterbodies from disturbed soils or other construction activity. The use of herbicides will not be allowed in any stream buffer areas.

Section 10, Buffers describes typical vegetation maintenance procedures within waterbody buffer zones. Detailed descriptions and drawings of the erosion and sedimentation control measures that will be used during construction of the line and final stabilization of the ROW, and the restrictions and procedures to be employed during post-construction vegetation maintenance are provided in the NRI E&S Plan and the NRI Vegetation Maintenance Plan, located in Appendices 14-1 and 10-1, respectively. It is important to note that existing understory vegetation will remain on the entire ROW during and following construction, except in localized areas where structures are required. The only areas where soil disturbance is likely is at structure locations. Installation of structures is typically completed within less than a day and the area is restored and stabilized. Appropriate erosion and sedimentation control measures will be

installed at these locations to prevent sedimentation of wetlands and waterbodies. As a result, the overall potential for erosion and sedimentation is minimal.

The proposed buffers are greater than MDIFW prior recommendations to protect waterbodies from sedimentation and surface runoff, as confirmed in emails received from MDIFW Fisheries Biologists on February 4, 2005, and to minimize adverse effects on wildlife habitat (see agency correspondence and January 20, 2005 meeting minutes in Appendix 7-2).

### ***7.B.2.a ASC Waters of Special Concern***

BHE is proposing to provide the tallest vegetated buffer possible, within the constraints of the NEPOOL Vegetation Maintenance Standard, for those streams that have been identified in the field to contain potential salmon habitat. To accomplish this, initial clearing and post-construction vegetation maintenance will consist of removing only those capable species that are likely to grow within 15 feet of a conductor (the smallest separation allowed by NEPOOL) within the next 3 to 4 year maintenance cycle. Topping of trees is the preferred method of vegetation maintenance within salmon habitat stream buffers, unless the tree is dead or dieing, or topping will leave insufficient vegetation to sustain the tree. In addition, individual structure (pole) locations on either side of salmon habitat streams will be sited as close to the stream buffer as practical (but not in the buffer). The closer the pole is to the stream the higher the conductor will be over the stream and buffer. This will create a conductor height that will preserve as much shading as possible. BHE consultations with fishery management agencies indicated concurrence with this mitigation proposal (see meeting minutes dated January 19, 2005 located in Appendix 7-2]. Section 10, Buffers describes the proposed vegetation maintenance practices in the salmon habitat stream buffer zones.

The Machias and Narraguagus Rivers are designated Outstanding River Segments under the NRPA and high value recreational resources. Due to special concerns about providing an effective visual buffer to screen the ROW and structures at these two river crossings, BHE is proposing to restrict the initial cutting of vegetation and follow-up maintenance trimming to only those species that are likely to encroach on the NEPOOL conductor safety zone within the next

maintenance cycle far beyond the typical 25-foot buffer width. As a result of providing visual screening, the effective buffer width at the Narraguagus River will be approximately 290 feet on the west side and approximately 500 feet on the east side. At the Machias River, the effective buffer width will be approximately 210 feet on the west side and approximately 360 feet on the east side.

All other erosion and sedimentation control procedures and requirements and vegetation maintenance restrictions that apply in all waterbody buffers will also apply in the salmon habitat stream buffers.

#### ***7.B.2.b Other Potential Salmon Streams***

As discussed previously in this section, the Distinct Population Segment of Atlantic salmon associated with the Narraguagus, Machias and East Machias Rivers has been listed as endangered under the ESA. In accordance with the recommendation of the ASC (see ASC letter dated January 24, 2005 in Appendix 7-2), BHE will apply the salmon habitat stream buffer clearing and maintenance restrictions described above at all streams located in these three watersheds. Most of these additional streams are less than 10 feet wide. Accordingly, the potential for additional vegetation height along these streams should minimize potential warming that might otherwise result from removal of adjacent vegetation.

#### ***7.B.2.c American Eel, Alewife and Blueback Herring***

American eel, alewife and, possibly, blueback herring may be present in rivers and streams within the Narraguagus, Machias and St. Croix River watersheds. Nevertheless, potential adverse impacts to these migratory species are not expected to result from construction or operation of the NRI project. No in-stream work is required. The main stem of the Narraguagus, Machias and St. Croix Rivers will be crossed using existing bridges. Any temporary stream crossings that are needed in these watersheds, or elsewhere, will span the stream and appropriate erosion and sedimentation controls will be applied. As described previously in Section 7.B, the proposed restrictions on cutting of vegetation, herbicide and

petroleum use within waterbody buffers will help ensure that water quality and temperature are not affected.

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**APPENDIX 7-1**  
**OBSERVED AND POTENTIAL WILDLIFE SPECIES ASSOCIATED**  
**WITH THE PROJECT AREA**

## **Wildlife Species Occurring or Potentially Occurring in the Project Area.**

The following table provides information on the wildlife resources that occur or potentially occur in the Northeast Reliability Interconnect project area. The table was compiled from information in DeGraaf and Yamasaki 2001 and through field observation. DeGraaf et. al. and Hunter et. al. 1992 provide a species list, relative abundance, habitat, and general impact information.

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

### Wildlife Species That Occur or Potentially Occur in the Project Area

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
<b>HERPETILES</b>				
Blue-spotted Salamander	<i>Ambystoma laterale</i>	R		Moist areas such as vernal pools and forested wetlands
Spotted Salamander	<i>Ambystoma maculatum</i>	C		Moist forested areas, vernal pools, marshy areas, mixed woods
Red-spotted Newt	<i>Notophthalmus viridescens</i>	C		Juveniles (red eft) in moist forested areas, adults in slow moving waters
N. Dusky Salamander	<i>Desmognathus fuscus</i>	C		Cool running waters at forest margin
Redback Salamander*	<i>Plethodon cinereus</i>	A		Mixed deciduous woodlands; under decaying logs, rocks and litter
Four-toed Salamander	<i>Hemidactylium scutatum</i>	R		Wet forested areas with sphagnum moss, bogs
N. Two-lined Salamander	<i>Eurycea bislineata</i>	C		Floodplains, moist forests near seeps
E. American Toad*	<i>Bufo americanus</i>	C		Forested habitats, existing ROW
N. Spring Peeper	<i>Pseudacris crucifer</i>	C to A		Wetlands such emergent and scrub-shrub, edges of waterbodies
Gray Tree frog*	<i>Hyla versicolor</i>	C		Forested areas, scrub-shrub swamps
Bullfrog	<i>Rana catesbeiana</i>	C		Shorelines of large waterbodies
Green Frog*	<i>Rana clamitans</i>	C		Riparian areas along waterbodies and shallow pools
Mink Frog	<i>Rana septentrionalis</i>	C		Margins of ponds, waterbodies
Wood Frog	<i>Rana sylvatica</i>	C		Forested areas, vernal pools
N. Leopard Frog*	<i>Rana pipiens</i>	C		Wet open fields, emergent wetlands
Pickerel Frog*	<i>Rana palustris</i>	C		Wet open areas, waterbodies and pond margins
Snapping Turtle	<i>Chelydra serpentina</i>	C		Permanent waterbodies
Wood Turtle	<i>Clemmys insculpta</i>	U to C		Slow-moving sandy/gravel bottom waterbodies, fields and woods
E. Painted Turtle	<i>Chrysemys picta</i>	C		Slow, quiet waterbodies
N. Water Snake	<i>Nerodia sipedon</i>	C		Permanently flooded wetlands, waterbodies
N. Redbelly Snake	<i>Storeria occipitomaculata</i>	C		Moist woodlands, bogs with sphagnum
E. Garter Snake*	<i>Thamnophis sirtalis</i>	A		Variety of terrestrial habitats
N. Ringneck Snake	<i>Diadophis punctatus</i>	C		Shady woodlands and under logs, rocks
E. Smooth Green Snake	<i>Ophedryx vernalis</i>	U		Upland areas, scrublands, existing ROW
E. Milk Snake	<i>Lampropeltis triangulum</i>	U		Variety of habitats such as scrublands, woodlands and ROW edge
<b>MAMMALS</b>				
Masked Shrew	<i>Sorex cinereus</i>	U to C		Damp woodlands with structures
Water Shrew	<i>Sorex palustris</i>	U		Riparian and wetland areas in coniferous areas

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
Smoky Shrew	<i>Sorex fumeus</i>	U		Moist, bouldery upland areas with moss, clear cuts
Long-tailed Shrew	<i>Sorex dispar</i>	R		Deep coniferous/mixed forests, with moss covered rocks
Short-tailed Shrew*	<i>Blarina brevicauda</i>	C		Variety of open wooded habitats
Pygmy Shrew	<i>Sorex hoyi</i>	R to U		Variety of wooded habitats
Hairy-tailed Mole	<i>Parascalops breweri</i>	C		Open wooded areas, fields
Star-nosed Mole	<i>Condylura cristata</i>	U to C		Moist, open areas
Little Brown Myotis	<i>Myotis lucifugus</i>	C		Near waterbodies and wetlands, tree cavities
Northern (Keen's) Myotis	<i>Myotis septentrionalis</i>	U to C		Mixed forested landscapes
Silver-haired bat	<i>Lasionycteris noctivagans</i>	U to C		Wooded areas with loose bark near waterbodies, tree cavities
Big Brown Bat	<i>Eptesicus fuscus</i>	C		Wooded areas, tree cavities
Red Bat	<i>Lasiurus borealis</i>	R		Edge of wooded areas
Hoary Bat	<i>Lasiurus cinereus</i>	R		Wooded coniferous areas
Snowshoe Hare*	<i>Lepus americanus</i>	A to C		Woodlands with dense cover, clear cuts, regeneration
E. Chipmunk*	<i>Tamias striatus</i>	A		Deciduous woodlands, ROW edge
Woodchuck*	<i>Marmota monax</i>	C		Woodland edges, open areas
Gray Squirrel	<i>Sciurus carolinensis</i>	U		Deciduous and mixed forest
Red Squirrel*	<i>Tamiasciurus hudsonicus</i>	A to C		Coniferous forests
N. Flying Squirrel	<i>Glaucomys sabrinus</i>	U		Deciduous and mixed forest above 1,000 feet
Beaver*	<i>Castor canadensis</i>	C		Slow moving waterbodies, wetlands
Deer Mouse	<i>Peromyscus maniculatus</i>	C		Coniferous or mixed forests, edges and clear cuts
S. Red-backed Vole*	<i>Clethrionomys gapperi</i>	C		Cool , moist forest with mossy rocks, clear cuts
Meadow Vole*	<i>Microtus pennsylvanicus</i>	C		Open areas such as fields, marshes and clear cuts
Muskrat	<i>Ondatra zibethicus</i>	U to C		Marshes and slow waterbodies with cattail
S. Bog Lemming	<i>Synaptomys cooperi</i>	U		Marshes, meadows and mixed woodlands with duff
N. Bog Lemming	<i>Synaptomys borealis</i>	R		Sphagnum bogs, black spruce and hemlock areas
Norway Rat*	<i>Rattus norvegicus</i>	C		Industrial, farm and residential areas
House Mouse	<i>Mus musculus</i>	C		Buildings, fields, corncribs
Meadow Jumping Mouse*	<i>Zapus hudsonius</i>	C		Moist, open meadows, shrub swamps and wooded uplands
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	C		Meadows, marshes, clear cuts and wooded areas
Porcupine	<i>Erethizon dorsatum</i>	C		Mixed or coniferous forest
Coyote*	<i>Canis latrans</i>	C		Forest edge, existing ROW
Red Fox*	<i>Vulpes vulpes</i>	U to C		Forest edge, existing ROW, meadows
Black Bear*	<i>Ursus americanus</i>	U		Mixed Forest and swamps
Raccoon*	<i>Procyon lotor</i>	C		Wooded areas along waterbodies

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
Pine Marten	<i>Martes martes</i>	U		Deciduous and coniferous forest
Fisher*	<i>Martes pennanti</i>	U		Mixed and coniferous forest
Ermine	<i>Mustela erminea</i>	U		Variety of brushy, wooded habitats, close to waterbodies
Long-tailed weasel*	<i>Mustela frenata</i>	U		Open areas, forest edge, existing ROW
Mink	<i>Mustela vison</i>	U		Riparian and wetland areas
Striped Skunk	<i>Mephitis mephitis</i>	C		Open woodlands, meadows
River Otter	<i>Lutra canadensis</i>	U		Riparian areas and wetlands
Lynx	<i>Felis lynx</i>	R		Extensive forest
Bobcat	<i>Lynx rufus</i>	U		Mixed and deciduous forest, brushy fields, swamps
White-tailed deer	<i>Odocoileus virginianus</i>	C		Forest edge, coniferous swamps
Moose	<i>Alces alces</i>	C		Emergent wetlands, waterbodies edges, forest
<b>BIRDS</b>				
Common Loon	<i>Gavia immer</i>	U	B	Large waterbodies
Pied-billed Grebe	<i>Podilymbus podiceps</i>	U	B	Ponds, marshes with heavy emergent vegetation
American Bittern	<i>Botaurus lentiginosus</i>	U	B	Marshes, bogs, and waterbodies
Great Blue Heron*	<i>Ardea herodias</i>	C	B	Shallow shores of marshes and waterbodies
Green Heron	<i>Butorides virescens</i>	U	B	Waterbodies and shrub wetlands
Canada Goose*	<i>Branta canadensis</i>	U	PR	Wetlands and waterbodies
Wood Duck*	<i>Aix sponsa</i>	U to C	B	Shallow water ponds, lakes and wetlands near wooded areas
Green-winged Teal	<i>Anus crecca</i>	U	B	Ponds, lakes and marshes
American Black Duck*	<i>Anus rubripes</i>	C	PR	Emergent and shrub wetlands, flowages, rivers and lakes
Mallard*	<i>Anus platyrhynchos</i>	C	PR	Emergent and shrub wetlands, rivers and lakes
Ring-necked Duck	<i>Aythya collaris</i>	C	B	Marshes, bogs, and flowages
Common Goldeneye*	<i>Bucephala clangula</i>	C	B	Ponds, lakes and rivers near wooded areas
Hooded Merganser	<i>Lophodytes cucullatus</i>	U	B	Wooded ponds, lakes and rivers
Common Merganser*	<i>Mergus merganser</i>	C	B	Rivers and lakes
Red-breasted Merganser*	<i>Mergus serrator</i>	C	B	Rivers and lakes
Osprey*	<i>Pandion haliaetus</i>	C	B	Near large waterbodies
Bald Eagle*	<i>Haliaeetus leucocephalus</i>	U	B	Near large waterbodies
Northern Harrier	<i>Circus cyaneus</i>	U	B	Meadows, emergent wetlands, bogs
Sharp-shinned Hawk	<i>Accipiter striatus</i>	U	B to PR	Isolated forested areas, edges
Cooper's Hawk	<i>Accipiter cooperii</i>	U	B to PR	Extensive forests
Northern Goshawk	<i>Accipiter gentilis</i>	R	B	Extensive forests
Red-shouldered Hawk	<i>Buteo lineatus</i>	U	B	Woodlands, forested wetlands

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
Broad-winged Hawk*	<i>Buteo platypterus</i>	U	B	Woodlands, forested wetlands
Red-tailed Hawk*	<i>Buteo jamaicensis</i>	U	B to PR	Woodlands, ROW corridors, old fields
Rough-legged Hawk	<i>Buteo lagopus</i>	R	W	Open fields, marshes
American Kestrel	<i>Falco sparverius</i>	U	B	ROW edges, old fields near tree cavities
Merlin	<i>Falco columbarius</i>	U to C	B	Open forests adjacent to open areas for foraging
Peregrine Falcon	<i>Falco peregrinus</i>	U	B	Rocky cliffs with ledges overlooking waterbodies, lakes, with a abundance of birds
Wild Turkey	<i>Meleagris gallopavo</i>	C		Varied: wooded areas for roosting, open areas for foraging
Ruffed Grouse*	<i>Bonasa umbellus</i>	C	PR	Forested areas with herbaceous openings, ROW edges
Spruce Grouse*	<i>Falcapennis canadensis</i>	U	PR	Dense interior coniferous forest, cedar bogs
Virginia Rail	<i>Rallus limicola</i> )	U	B	Marshes and cattail swamps
Sora	<i>Porzana carolina</i>	U	B	Marshes and cattail swamps
Spotted Sandpiper*	<i>Actitis macularia</i>	C	B	Edges of lakes and rivers
Killdeer	<i>Charadrius vociferus</i>	U	B	Barren areas, pastures, gravel pits
Common Snipe	<i>Gallinago gallinago</i>	C	B	Marshes, emergent bogs
American Woodcock*	<i>Scolopax minor</i>	C	B	Moist woodlands, alder thickets
Herring Gull*	<i>Larus argentatus</i>	U	B	Large waterbodies
Rock Dove*	<i>Columba livia</i>	C	PR	Near human dwellings
Mourning Dove*	<i>Zenaida macroura</i>	C	B to PR	ROW corridors, open woodlands, backyards
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	U	B	Brushy areas, open woodlands
Great Horned Owl	<i>Bubo virginianus</i>	U	PR	Interior woodlands, forest edges, wetlands
Barred Owl	<i>Strix varia</i>	U	PR	Forested wetlands, bottomlands
Long-eared Owl	<i>Asio otus</i>	U	B	Dense (usually coniferous) forests or groves
Boreal Owl	<i>Aegolius funereus</i>	U	W	Dense coniferous and mixed hardwood forests
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	U	PR	Woodlands, edges
Common nighthawk	<i>Chordeiles minor</i>	U	B	Open woodlands, railroad beds, clearings
Chimney Swift*	<i>Chaetura pelagica</i>	U to C	B	Near human dwellings
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	C	B	Woodlands, edges, swamps
Belted Kingfisher*	<i>Ceryle alcyon</i>	C	B	Waterbodies, banks of waterbodies
Yellow-bellied Sapsucker*	<i>Sphyrapicus varius</i>	C	B	Woodlands, edges
Downy Woodpecker*	<i>Picoides pubescens</i>	C	PR	Forests
Hairy Woodpecker	<i>Picoides villosus</i>	C	PR	Forests

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
Three-toed Woodpecker	<i>Picoides dorsalis</i>	R	PR	Coniferous forest, clear cuts with dead timber
Black-backed Woodpecker	<i>Picoides arcticus</i>	R	PR	Coniferous forest, clear cuts with dead timber
Northern Flicker*	<i>Colaptes auratus</i>	C	B	Open woodlands, edges, clear cuts
Pileated Woodpecker*	<i>Dryocopus pileatus</i>	U	PR	Interior second growth forest, forested wetlands
Olive-sided Flycatcher*	<i>Contopus cooperi</i>	U	B	Spruce forests, bog edges
Eastern Wood Pewee	<i>Contopus virens</i>	U	B	Forest interior
Alder Flycatcher	<i>Empidonax alnorum</i>	U	B	Shrub wetlands with openings
Least Flycatcher*	<i>Empidonax minimus</i>	U	B	Deciduous woodlands, edges, forested wetlands
Eastern Phoebe	<i>Sayornis phoebe</i>	U	B	Wooded or shrub areas near waterbodies
Great crested Flycatcher	<i>Myiarchus crinitus</i>	U	B	Woodlands, forested swamps
Eastern Kingbird	<i>Tyrannus tyrannus</i>	U	B	Open woodlands, shrub wetlands
Horned Lark	<i>Eremophila alpestris</i>	U	W	Open areas, fields, pastures
Tree Swallow*	<i>Tachycineta bicolor</i>	C	B	Open areas near water, beaver flowages
Bank Swallow*	<i>Riparia riparia</i>	U	B	Riverbanks, gravel pits
Barn Swallow*	<i>Hirundo rustica</i>	C	B	Near farms, pastures
Blue Jay*	<i>Cyanocitta cristata</i>	C	PR	Woodlands, towns
Gray Jay*	<i>Perisoreus canadensis</i>	U	PR	Coniferous forest, cedar bogs
American Crow*	<i>Corvus brachyrhynchos</i>	C	PR	Woodlands, ROW corridors
Common Raven*	<i>Corvus corax</i>	C	PR	Open woodlands, clear cuts
Black-capped Chickadee*	<i>Poecile atricapillus</i>	C	PR	Woodlands, towns
Boreal Chickadee	<i>Poecile hudsonicus</i>	U	PR	Coniferous forest, spruce bogs
White-breasted Nuthatch*	<i>Sitta carolinensis</i>	C	PR	Deciduous woodlands
Red-breasted Nuthatch*	<i>Sitta canadensis</i>	C	PR	Coniferous Forest
Brown Creeper	<i>Certhia americana</i>	U	B	Dense woodlands
House Wren	<i>Troglodytes aedon</i>	U	B	Near human dwellings, brushy clearings
Winter Wren	<i>Troglodytes troglodytes</i>	C	B	Dense coniferous undergrowth, bog edges
Marsh Wren	<i>Cistothorus palustris</i>	U	B	Marshes
Golden-crowned Kinglet*	<i>Regulus satrapa</i>	C	B	Coniferous forest
Ruby-crowned Kinglet	<i>Regulus calendula</i>	U	B	Coniferous forest, edges
Eastern Bluebird	<i>Sialia sialis</i>	U	B	Open woodlands, clearings, edges
Veery*	<i>Catharus fuscescens</i>	U	B	Moist deciduous woodlands
Swainson's Thrush	<i>Catharus ustulatus</i>	U	B	Coniferous forest, near water
Hermit Thrush	<i>Catharus guttatus</i>	U	B	Wooded swamps, coniferous edges
American Robin*	<i>Turdus migratorius</i>	C	B	Open woodlands, clearings pastures

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
Gray Catbird*	<i>Dumetella carolinensis</i>	C	B	Brushy edges, shrub wetlands, clear cuts
Northern Mockingbird	<i>Mimus polyglottos</i>	U	PR	Near towns in brush
Cedar Waxwing*	<i>Bombycilla cedrorum</i>	C	B	Open woodlands, open orchards, towns
Northern Shrike	<i>Lanius excubitor</i>	R	W	Open woodlands, brushy areas
European Starling*	<i>Sturnus vulgaris</i>	C	PR	Towns, farms and fields
Blue-Headed (Solitary) Vireo*	<i>Vireo solitarius</i>	C	B	Mixed woodlands with dense understory
Warbling Vireo	<i>Vireo gilvus</i>	U	B	Open woodlands
Philadelphia Vireo	<i>Vireo philadelphicus</i>	U	B	Forests, edges, ROW corridors
Red-eyed Vireo	<i>Vireo olivaceus</i>	C	B	Open deciduous forest
Tennessee Warbler*	<i>Vermivora peregrina</i>	C	B	ROW edges, open woodlands, dense shrubs
Nashville Warbler *	<i>Vermivora ruficapilla</i>	C	B	Moist deciduous forest, edges
Northern Parula Warbler*	<i>Parula americana</i>	C	B	Mix forest with old man's beard, forested wetlands
Yellow Warbler*	<i>Dendroica petechia</i>	C	B	Shrub and emergent wetlands, brushy areas along waterbodies
Chestnut-sided Warbler*	<i>Dendroica pensylvanica</i>	C	B	Regeneration areas, clear cuts, ROW corridors
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	U	B	Mixed or deciduous forests with dense undergrowth
Yellow-rumped Warbler*	<i>Dendroica coronata</i>	C	B	Coniferous forest, edges
Black-throated Green Warbler*	<i>Dendroica virens</i>	C	B	Mixed forest, forested wetlands
Palm Warbler	<i>Dendroica palmarum</i>	U	B	Bogs and bog edges
Bay-breasted Warbler	<i>Dendroica castanea</i>	U	B	Coniferous forest, coniferous shrub areas
Black-white Warbler*	<i>Mniotilta varia</i>	C	B	Forest and second growth
American Redstart	<i>Setophaga ruticilla</i>	C	B	Deciduous woodlands, forested wetlands
Ovenbird*	<i>Seiurus aurocapilla</i>	C	B	Mature deciduous forest, no undergrowth
Northern Waterthrush	<i>Seiurus noveboracensis</i>	U	B	Forested wetlands near waterbodies
Mourning Warbler*	<i>Oporornis Philadelphia</i>	C	B	ROW corridors, clear-cuts
Common Yellowthroat*	<i>Geothlypis trichas</i>	C	B	Shrub wetlands, brushy areas
Wilson's Warbler*	<i>Wilsonia pusilla</i>	U	B	Bogs, shrub wetlands
Canada Warbler	<i>Wilsonia canadensis</i>	U	B	Moist forest with undergrowth, forested wetlands
Rose-breasted Grosbeak*	<i>Pheucticus ludovicianus</i>	C	B	Deciduous forest
Indigo Bunting*	<i>Passerina cyanea</i>	C	B	Forest edges and openings, ROW corridors
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>	U	B	Forest edges and openings, ROW corridors
Chipping Sparrow	<i>Spizella passerina</i>	C	B	Towns, farms, fields
Savannah Sparrow	<i>Passerculus sandwichae</i>	U	B	Meadows, fields

## Wildlife Species Occurring or Potentially Occurring in the Project Area.

Species	Scientific Name	Relative Abundance <sup>1</sup>	Status <sup>2</sup>	Habitat
Song Sparrow*	<i>Melospiza melodia</i>	C	B	Brushy fields, shrub wetlands, towns
Swamp Sparrow*	<i>Melospiza georgiana</i>	U	B	Shrub and emergent wetlands, waterbodies edges
White-throated Sparrow*	<i>Zonotrichia albicollis</i>	C	B	Brushy areas, clear-cuts, bogs
Dark-eyed Junco*	<i>Junco hyemalis</i>	C	PR	Forest, clearings, ROW edges
Snow Bunting*	<i>Plectrophenax nivalis</i>	U	W	Fields, open areas
Bobolink	<i>Dolichonyx oryzivorus</i>	U	B	Hay fields, meadows
Red-winged Blackbird*	<i>Agelaius phoeniceus</i>	C	B	Marshes, swamps, hay fields
Rusty Blackbird	<i>Euphagus carolinus</i>	U	B	Shrub wetlands, bogs
Common Grackle*	<i>Quiscalus quiscula</i>	C	B	Open areas, farms, wetlands
Brown-headed Cowbird	<i>Molothrus ater</i>	U	B	Open woodlands, ROW corridors
Eastern Meadowlark	<i>Sturnella magna</i>	U	B	Fields, farmland
Baltimore Oriole	<i>Icterus galbula</i>	U	B	Open woodland near waterbodies
Pine Grosbeak	<i>Pinicola enucleator</i>	U	W	Coniferous forest and forest edges
Purple Finch*	<i>Carpodacus purpureus</i>	C	PR	Coniferous forest edge, parks, towns
Red Crossbill*	<i>Loxia curvirostra</i>	C	PR	Coniferous forest
White-winged Crossbill*	<i>Loxia leucoptera</i>	C	PR	Coniferous forest
Common Redpoll	<i>Carduelis flammea</i>	U	W	Alder swamps, birches, fields
Hoary Redpoll	<i>Carduelis hornemanni</i>	R	W	Fields, birch and alder thickets
Pine Siskin*	<i>Carduelis pinus</i>	C	PR	Coniferous forest, fields
American Goldfinch*	<i>Carduelis tristis</i>	C	PR	Fields, alder and birches
Evening Grosbeak*	<i>Coccothraustes vespertinus</i>	C	PR	Coniferous forest
House Sparrow*	<i>Passer domesticus</i>	C	PR	Villages, farms, cities, parks, avoids heavily forested areas

<sup>1</sup> A=Abundant; C=Common; U=Uncommon; R=Rare

<sup>2</sup> B=Breeding in Project Area; PR=Permanent Resident; W=Wintering in Project Area

\* Observed in the vicinity of the Project during 2002, 1997 and 1996 field surveys

**APPENDIX 7-2**  
**AGENCY CORRESPONDENCE**

**APPENDIX 7-3**  
**SIGNIFICANT WILDLIFE HABITAT MAPS FOR THE PROJECT AREA**

**APPENDIX 7-4**  
**WATERBODIES CROSSED BY THE NRI PROJECT**