

Transportation and Service Corridors

The ‘transportation and service corridors’ category (IUCN 4) includes threats from a variety of vehicles operating on land, water and air, and the infrastructure and management that they require to operate, as well as utility and service lines used to transport energy and resources. For the purposes of the New Hampshire Wildlife Action Plan, threats in this category were often evaluated under the following specific sub-categories:

- Roads & railroads - surface transport on roadways and dedicated tracks
- Utility & service lines - transport of energy & resources
- Shipping lanes - transport on and in freshwater and ocean waterways and associated dredging and dumping of dredged materials
- Flight paths - air transport
- Airports - management of grassland areas surrounding runways at airports

Several related threats are known and summarized under other threat summaries (e.g., Residential and Commercial Development, IUCN 1; Pollution, IUCN 9).

Risk Assessment Summary

The transportation & service corridor threat was evaluated for 114 unique threats across 20 habitats and 77 species (Table 4-20). The majority of threat assessment scores were ranked as low (n=67, 59%), followed by moderate (n = 37, 32%) and high ranking threats (n = 10, 9%).

Roads and railroads were the primary type of transportation identified in habitat and species risk assessment (Table 4-20). Roads were identified as a high threat category for four habitat types, all of which were either wetlands or aquatic habitat types. Roads were identified as a moderate threat category for three habitat types. Roads were identified as a high threat category for four species, three of which were turtles. Roads were identified as a moderate threat category for 14 species and ranged from species that are fully aquatic to primarily terrestrial. Removal of roosting habitat for roadway expansion or creation was a low ranking threat for seven bat species, primarily due to a low predicted spatial extent score and some lack of certainty.

Utility and service lines was identified as a moderate threat for northern black racers. The primary threat identified for black racers was associated with management of utility lines, particularly mortality to individual snakes from machinery or compaction of underground den sites. Nesting turtles, New England cottontails, and birds associated with grasslands and shrublands could also be impacted by some vegetative management along utility lines, but these species were not included in assessments. Removal of roosting habitat for utility right of way expansion or creation was a low ranking threat for seven bat species, primarily due to a low predicted spatial extent score and some lack of certainty.

Shipping lanes, and associated dredging and dumping of dredged materials, was evaluated for 15 species and five habitats, all occurring on the coast. Shipping lanes ranked as a moderate threat for marine and dune habitats and several species including fin whale and softshell clam. Shipping lands and associated

dredging and dumping of dredged materials ranked as a low ranking threat for 13 of 20 (65%) species and habitats evaluated which was largely influenced by a localized (i.e., low ranking) spatial extent score. Stressors identified for this threat ranged from species disturbance and mortality to ecosystem degradation.

Management of airports was a moderate to high ranking threat for grasslands and associated grassland birds including upland sandpipers, eastern meadowlarks, grasshopper sparrows, horned lark, and vesper sparrow. Airport management was also a threat for pine barrens lepidoptera including Karner blue butterfly and frosted elfin.

Flight paths were evaluated only for peregrine falcons, and was ranked as a low ranking threat. Disturbance from planes or helicopters near nests could be a localized concern to evaluate in future.

Known Wildlife Exposure Pathways

Mortality and collision on roadways and shipping lanes

Mortality can affect the dispersal and viability of isolated populations, and eventually cause local extirpation (Trombulak and Frissell 2000, Forman et al. 2003). At greatest risk are slow-moving species (e.g., reptiles and amphibians), species that depend on high adult survivorship (turtles), species that are long range dispersers (bobcat, American marten, wolves), or species with scarce populations (timber rattlesnake) (Fahrig and Rytwinski 2009). Low population densities and skewed age and sex ratios have raised concerns about the effect of road mortality on the viability of some turtle populations in the region (e.g., Marchand and Litvaitis 2004, Gibbs and Steen 2005, Patrick and Gibbs 2010). Turtles are attracted to the bare soil and open canopy of road shoulders and utility corridors, but adults and hatchlings are at risk from vehicles. Snakes may be attracted to roads to bask on warm pavement surfaces (Trombulak and Frissell 2000). Wide-ranging mammals such as bobcat, lynx, American marten, and wolves are likely to encounter and cross roads. As traffic volume increases, vehicle collisions become increasingly probable, reducing local population abundances and decreasing the likelihood and frequency of dispersal to unoccupied or low-density habitats (Litvaitis, University of New Hampshire, personal communication). Large mammals crossing roadways (e.g., black bear, moose, and deer), although not likely to be a population viability concern, cause safety concerns for motorists. Whales and other marine mammals may be vulnerable to collision with boats in marine habitats (Jensen and Silber 2004).

Habitat loss and fragmentation

New Hampshire's human population density and associated development continues to increase, especially in the southern counties (Johnson 2012, Society for Protection of New Hampshire Forests 2005). Increasing human population density leads to increasing road densities, road widening, and higher traffic volume (see Development threat). The construction of roads, railroads and airports results in a considerable loss of habitat (Trombulak and Frissell 2000). Furthermore, areas bisected by roads result in smaller, fragmented blocks of habitat, with more isolated local populations potentially at a higher risk of localized extinction (Saunders et al. 1991 (Fahrig 2002)).

Wildlife is affected well beyond the scope of the actual physical disturbance (Forman and Deblinger 2000, Jones et al. 2000); while roadways are estimated to cover ~1% of the land area of the United States, up to 19% of this area has been projected to be ecologically affected by roads (Forman 2000). For example, effects of roadway noise may extend hundreds of meters from a heavily traveled road,

reducing species occupation (e.g., forest interior birds) and altering behavior (Forman and Deblinger 2000, Forman et al. 2003). Roads can affect aquatic habitats by increasing contaminated runoff and increasing water temperatures (see Pollution summary).

Dispersal

The effects of roads and utility corridors as barriers to wildlife movement are widespread (Andrews 1990, Forman et al. 2003, Trombulak and Frissell 2000). Roads that bisect seasonal or annual wildlife migration routes are of particular concern, especially for rare amphibians and reptiles that migrate between wetlands and uplands or between wetland complexes (Fahrig et al. 1995, Trombulak and Frissell 2003). New England cottontails may be reluctant to cross a wide road because of the break in dense cover that they prefer (J. Litvaitis, University of New Hampshire, personal communication). Lepidoptera may be impeded from crossing roads by vehicular wind (S. Fuller, NHFG, personal communication). Road design can block wildlife; Jersey barriers and steep-sloping granite curbs can trap small organisms on roadways and increase mortality risk (Klemens 2000; M. Marchand, NHFG, personal observation). Underpasses (e.g., culverts) at stream crossings, especially those that are undersized or perched, may be ineffective for passage of aquatic organisms (Jackson 2003). Identifying optimal locations to place mitigation strategies such as crossing structures can also be difficult (Beaudry et al. 2008, Patrick et al. 2012).

Mortality and habitat loss from vegetation management

Areas surrounding airport runways and roadsides often are cleared of native vegetation and are maintained as homogenous mowed habitat, largely due to safety concerns (Forman et al. 2003). Mowing and shrub/tree management during critical times can have serious effects on local populations of plants or wildlife (e.g., Karner blue butterfly, frosted elfin butterfly, northern black racer, grasshopper sparrow, upland sandpiper, and New England cottontail). Utility and service corridors can provide suitable habitat for species dependent on shrubland habitats (Askins et al. 2012). However, management of these areas can result in loss or degradation of habitat and direct mortality of animals, depending on the timing of management and practices employed. For example, removal of dense shrublands occupied by New England cottontail removes important structure used as habitat and exposes individual rabbits to predators. Removal of vegetation during winter is particularly problematic because alternative cover (grasses, forbs, stick piles) is typically reduced from snowfall and seasonal dieback. Conversely, wood turtles hibernate underwater in streams during winter and therefore are not typically adversely impacted by management in the uplands during this time. During spring through fall, wood turtles use dense shrublands and grasslands and are vulnerable to crushing from management equipment.

Dredging of Shipping Lanes

Dredging harbors (e.g., Hampton harbor) and shipping lanes can adversely affect local populations of benthic invertebrates such as softshell clams by removing substrate used as habitat and resulting in mortality of individuals (Boyd et al. 2005, Thrush and Dayton 2002) and disturbance to foraging areas for certain fish. Placement of dredged spoils can impact dune habitats.

Research Needs

- Identify specific areas of the landscape where connectivity is limited by a road and identify options for increasing safe passage of wildlife
- Identify significant travel corridors for species of concern to provide guidance to transportation planners

- Monitor (e.g., with radio-telemetry, remote cameras, or mark-recapture) wildlife populations in areas where underpass systems have been installed or are proposed, to evaluate success
- Expand collection of road-killed data. Currently, the only species monitored are deer, bear, moose and turkey. Data collection could make use of volunteers (e.g., Reptile and Amphibian Reporting Program) and those likely to encounter road kill (New Hampshire Department of Transportation road agents).
- Evaluate road design, roadside habitat management and road placement so that it is least detrimental to significant natural resources.
- Identify populations of SGCN (e.g., reptiles, New England cottontail) occupying utility and service corridors to inform management.

Table 4-20. Habitats and species at highest risk from the effects of transportation & service corridors (threats ranking as *Low* not included here). IUCN Level 2 provided if evaluated to that level. Some habitats and species were evaluated for multiple specific threats separately and therefore listed multiple times below. Airport management was not listed as option during threat assessment so these were included as ‘Not Specified’. See Appendix E for additional information on specific threats and rankings.

| Habitat | IUCN Level 2 | Overall Threat Score |
|------------------------------|---------------------|-----------------------------|
| Appalachian Oak Pine Forest | Roads & railroads | M |
| Coldwater rivers and streams | Roads & railroads | H |
| Dunes | Shipping lanes | M |
| Estuarine | Shipping lanes | M |
| Floodplain Forests | Roads & railroads | M |
| Grasslands | Not Specified | M |
| Marine | Shipping lanes | M |
| Marsh and Shrub Wetlands | Roads & railroads | H |
| Temperate Swamp | Roads & railroads | M |
| Vernal Pools | Roads & railroads | H |
| Warmwater rivers and streams | Roads & railroads | H |

| Common Name | IUCN Level 2 | Overall Threat Score |
|------------------------|---------------------|-----------------------------|
| American Brook Lamprey | Roads & railroads | H |
| Bald Eagle | Roads & railroads | M |
| Blanding's Turtle | Roads & railroads | H |
| Box Turtle | Roads & railroads | M |
| Brook Trout | Roads & railroads | M |
| Cerulean Warbler | Roads & railroads | M |
| Eastern Meadowlark | Not Specified | M |
| Fin Whale | Shipping lanes | M |
| Fowlers Toad | Roads & railroads | M |
| Frosted Elfin | Not Specified | M |
| Grasshopper Sparrow | Not Specified | M |
| Hognose Snake | Roads & railroads | M |
| Horned Lark | Not Specified | M |
| Humpback whale | Shipping lanes | M |

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|---|-------------------------|---|
| Jefferson/Blue-Spotted Salamander Complex | Roads & railroads | M |
| Karner Blue Butterfly | Not Specified | M |
| Karner Blue Butterfly | Roads & railroads | M |
| Marbled Salamander | Roads & railroads | M |
| North Atlantic Right Whale | Shipping lanes | M |
| Northern black racer | Roads & railroads | M |
| Northern black racer | Utility & service lines | M |
| Northern Leopard Frog | Roads & railroads | M |
| Redfin Pickerel | Roads & railroads | M |
| Ribbon snake | Roads & railroads | M |
| Softshell Clam | Shipping lanes | M |
| Spotted Turtle | Roads & railroads | H |
| Timber Rattlesnake | Roads & railroads | M |
| Upland Sandpiper | Not Specified | H |
| Vesper Sparrow | Not Specified | M |
| Wood Turtle | Roads & railroads | H |

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