

Biological Resource Use

The ‘biological resource use’ category (IUCN 5) includes any “threat of consumptive use of wild biological resources including the effects of deliberate and unintentional harvesting; including the persecution or control of specific species” (Salafsky et al. 2008). The types of biological resource use include:

Hunting and collecting of terrestrial animals: This is defined as the killing or trapping of terrestrial wild animals or animal products for commercial, recreation, subsistence, research or cultural purposes, or for control/persecution. This also includes accidental mortality and bycatch.

Fishing and harvesting aquatic resources: This is the harvesting of aquatic wild animals or plants for commercial, recreational, subsistence, research, or cultural purposes, or for control/persecution reasons. This also includes accidental mortality and bycatch.

Gathering of terrestrial plants: This is defined as the harvesting of plants, fungi, and other non-timber/non-animal products for commercial, recreational, subsistence, research or cultural purposes, or for control reasons.

Logging and wood harvesting: This is the harvesting of trees and other woody vegetation for timber, fiber, or fuel.

Risk Assessment Summary

The biological resource use threat was evaluated for 159 unique threats across 18 habitats and 84 species (Table 4B-1). The majority of threat assessment scores were ranked as low (n=103, 65%), followed by moderate (n = 43, 27%) and high ranking threats (n = 13, 8%). Only the moderate and high ranking threats are summarized for each category in Table 4-12.

Hunting and collecting terrestrial animals

In NH, hunting and collecting of terrestrial animals was identified as a threat for 10 species (Table 4B-1). Hunting and collection of terrestrial animals can include commercial collection, collection or impacts due to human values, incidental take from activities such as hunting and trapping and scientific collection. Many of these threats were identified in the 2005 WAP, yet the 2015 analysis appears to be a more comprehensive list of species potentially impacted. The scope and severity of this issue is largely unknown because it can be difficult to monitor and assess.

Fishing and harvesting aquatic resources

Fishing and harvesting aquatic resources was identified as a high or moderate-ranking threat for two habitats and 10 species (Table 4B-1). This was also identified as a low ranking threat for an additional 16 species. Most threats in this category focused on unintentional impacts from large-scale fishing practices, where the species being assessed is not the target for harvest. Overfishing and by-catch are both forms of resource depletion that were noted in this threat evaluation. For most harvestable species, threats were evaluated by looking at how fishing pressure may add additional stress on a declining

population. In most cases, this threat is acting on species now, and is often well documented. Fishing and harvesting was having the greatest impact on northern shrimp, Atlantic sea scallop, and softshell clam, and is a high threat to marine habitat. Some birds were included in this threat category because over-harvesting of their marine prey species can have negative impacts on their populations.

Gathering of terrestrial plants

Gathering of terrestrial plants was identified as a threat in two habitats, both of which were ranked as low and were not summarized in the table. Although this threat was considered low ranking overall, it could become a larger concern within local populations of imperiled plants. Gathering of terrestrial plants can be for commercial purposes or even individual use. Additionally, there are potential impacts on plant populations from scientific collection and collection of plants for personal interest from specialized habitats. The scope, severity and certainty of these issues are poorly understood. Additionally, enforcement of regulation would be difficult to implement.

Logging and wood harvesting

Logging and wood harvesting was identified as a threat for 12 species and five habitats. Logging and wood harvesting was considered a low ranking threat for most of the habitats and species assessments (n=51, 72%). It was considered a moderate threat for 16 assessments (23%) and a high ranking threat for four species or habitat assessments (6%) (Table 4B-1). Logging and wood harvesting includes: direct species mortality from equipment, and practices such as liquidation harvesting and soil compaction that can cause forest type conversion or that can affect overall site quality. The scope of these issues is statewide and the severity and certainty varies by region. Impacts to wildlife have been well documented for these threats, yet the specific severity and extent in NH may be poorly understood or there may be a lack of tools to deal with the threats. Many of these issues were identified in 2005, but the current review seems to be more inclusive and defined.

Known Wildlife Exposure Pathways

Hunting and collecting terrestrial animals

Commercial collection

Many reptiles and amphibians are popular pets, and the international pet trade market is large (Franke and Telecky 2001). Most native reptiles and amphibians are vulnerable to commercial collection and sale. Those species characterized by late ages of maturity and high adult survival rates are generally most vulnerable (e.g., turtles and some snakes). Also, some species are extremely vulnerable due to the congregation of individuals (e.g., timber rattlesnakes and wood turtles). New state regulations within the last 10 years have prohibited the sale of all native reptiles and amphibians with a few exemptions. Possession rules are also in place for all native reptiles and amphibians where possession is prohibited for some species and limited for all others (NHFG Rules 800, 1400). It is not known to what extent illegal collection of protected species occurs in New Hampshire, but some rare species have been sold in the past (Levell 2000) and at least one conviction for illegal possession and sale of regulated turtles has occurred more recently.

Human values

Humans have a negative perception of some species and regard others as pests. Negative perceptions may lead people to destroy wildlife regardless of actual danger. Slaughter of individuals or purposeful destruction of critical habitat (e.g., den sites) may result in the local or state extirpation of some species (e.g., timber rattlesnakes, Brown 1992). Bats found in homes may be killed. Bug zappers often kill non-target species such as beetles and moths that are attracted to light. Some insect control programs are implemented to ease public concern (e.g., mosquito spraying to control West Nile virus), but may harm non-target species.

Conversely, many humans are fascinated with wildlife. Humans with positive intentions may move animals from what seems unfavorable habitat to another location, with adverse consequences. For example, relocating turtles may be the functional equivalent of removing the turtle from the wild because the relocated turtle can no longer interact with wild individuals.

Incidental take

Some species, including those that are rare or endangered in New Hampshire, are incidentally taken because of legal harvesting activities (hunting, trapping, and recreational or commercial fishing). For example, lynx may be incidentally captured in leg hold traps designed for restraining species (possibly resulting in injury) or body gripping traps designed for killing. American marten may be incidentally captured in body gripping traps. Spruce grouse may be confused with ruffed grouse and taken by hunters. Turtles may be taken in body gripping traps set under water for beaver and otter, but the impact on at-risk turtle populations is unknown.

Scientific collection

Scientific research has been conducted on a variety of taxonomic groups in New Hampshire, often resulting in take of individuals. Although this activity is often regulated, some species, especially invertebrates that are not state or federally threatened or endangered, are not regulated. Also, those species that are protected may be difficult to identify. For example, collection of some pine-barrens Lepidoptera (butterflies and moths) could have an impact on highly fragmented or small populations.

Fishing and harvesting aquatic resources

Commercial harvesting

In New Hampshire, harvestable species are partly managed through issuing licenses and specific harvest regulations. Fishing and harvesting of aquatic resources can have unintentional negative impacts on species and habitats. Commercial harvest can have unintended bycatch mortality on species not specifically targeted. Harvest of particular species can have a compounding effect on species already affected by environmental stressors. For example, the Northern shrimp population has other stressors that are impacting the population (i.e., warming water temperatures), which in turn have triggered changes in harvest limits and seasons. Commercial gear and fishing can directly affect habitat features and cause unintended mortality on various benthic communities and species. Within marine habitats, fishing and harvesting gear can cause physical damage to the bottom, impacting habitat suitability, potentially causing accidental mortality, and creating other issues for marine species. Actual physical impacts of harvesting are of low severity in New Hampshire, since the incoming tide helps reverse some damage from disturbed mud and other substrate.

Gathering of terrestrial plants

Commercial collection

The spring fiddleheads of ostrich fern (*Matteuccia struthiopteris* ssp. *pensylvanica*) are a popular local seasonal food. In New Hampshire, large populations of ostrich fern occur only on the floodplains of the Connecticut River, where fiddleheads are sometimes collected for commercial sale. Overcollection of fiddleheads can lead to the long-term decline of individual ostrich fern plants (University of Maine Cooperative Extension 2012). However, there is currently no evidence that overcollecting is occurring on New Hampshire floodplains.

American ginseng (*Panax quinquefolius*) is a threatened species in New Hampshire (S2) that is collected and sold as a medicinal herb. According to the Native Plant Protection Act ([RSA 217-A:9](#)), it is a violation “to export, import, transport, take, possess, sell, or ship any protected species.” However, the root of this species can bring a significant price, and illegal collection occurs regularly.

Scientific collection

Many alpine plant species are rare and populations may be impacted by over-collection. Rare alpine species can be illegal targets for collectors, but the threat of current-day collections is likely quite low. Legal collectors are required to get a permit from WMNF, who can ensure that collection pressure remains low (Sperduto, pers. comm.). However, some plant species may still be experiencing impacts of over-collecting that occurred many decades ago. Based on herbaria research, it appears that for at least one species, there are more specimens in herbaria than there are individual plants in the wild (Cogbill 1993).

Logging and wood harvesting

Direct mortality

The act of removing trees and use of machinery may cause direct mortality to wildlife. Mortality may be more problematic for imperiled populations where activity patterns are clustered at certain times of year.

Liquidation harvesting

Liquidation harvesting is often defined as the purchase of timberland followed by a harvest that removes most or all commercial value in standing timber, without regard for long-term forest management principles, and the subsequent sale or attempted resale of the harvested land within a short period of time. This type of harvesting commonly leads to subdivision and development that causes a decrease in available wildlife habitat and fragmentation of what remains. Liquidation harvesting is of greatest concern in northern NH where the majority of the state’s large land owners exist. Liquidation harvesting can have serious implications for American marten, three-toed woodpecker, spruce grouse, and other species.

Forest type conversion

Forest type conversion is most pronounced in low elevation spruce-fir forests when stands are clear-cut prior to the establishment of adequate levels of advanced regeneration (Frank and Bjorkbom 1973, Demming et al. 1995). In these situations, spruce-fir is generally replaced by light tolerant hardwoods

(e.g., pin cherry, birch, aspen, red maple) (Demming et al. 1995). Eventually, spruce-fir forest may become reestablished, but it will take many more decades than if harvests were carefully planned to ensure advanced regeneration. Removal of trees within Temperate and Northern Swamps will change habitat structure and composition and machinery in wetlands could alter wetland hydrology if not adequately planned and executed.

Impacts on non-timber values

Timber harvesting can have impacts on soil quality, wetland and water quality, plant and animal habitats, and other non-timber values. For instance, timber harvesting can compact soil, particularly organic soils such as peat, leading to increased runoff and nutrient loading (NHDFL and SPNHF 2010). Harvesting near vernal pools may reduce canopy cover, increase water temperatures (which may not be suitable for breeding amphibians), and cause premature drying of the pool (Calhoun and deMaynadier 2004).

Harvesting near streams and water bodies may reduce canopy cover and therefore increase water temperatures. Riparian areas are also important because they: control flood control areas; help to filter water by retaining sediment, nutrients and other pollutants; often contain rare natural communities; and can serve as important wildlife habitat and movement corridors (NHDFL and SPNHF 2010). Harvesting within these areas can negatively impact all these qualities.

Short rotation harvesting limits the availability of bark beetles in dead and dying spruce trees, which is the major food item for three-toed woodpeckers (Leonard 2001). It also limits the size and amount of coarse woody debris, which is required by American marten for denning and foraging (Hargis et al. 1999).

Timber harvesting can also limit the number of large trees with strong upper branches to support the nests of bald eagle, osprey, red-shouldered hawk, and Cooper's hawk, unless such trees are deliberately identified and protected during harvesting operations (Titus and Mosher 1981, Speiser and Bosakowski 1991, Bosakowski et al. 1992, Buehler 2000).

Research Needs

- Monitor focal populations to assess survivorship and loss of individuals from local populations, especially where human activity is intense (e.g., timber rattlesnakes, hognose snakes, wood turtles, Blanding's turtles, spotted turtles)
- Compile information on incidental captures (e.g., survey trappers and hunters) and assess ways to eliminate or reduce mortality of non-target species
- Assess cliff, floodplain forest, and other vulnerable habitats for risk of over collection of vegetation
- Assess current timber harvest levels and patterns in New Hampshire to better understand the extent of unsustainable harvesting in the state
- species
- Define long- and short-term impacts of clear-cutting on vernal pool wildlife survival and reproductive success
- Continue to monitor and regulate harvest seasons and limits
- Assess and implement ways to reduce non-target mortality.

Table 4-12. Habitats and species at highest risk from the effects of biological resource use (threats ranked as *Low* not included here). IUCN Level 2 provided if evaluated to that level (if not evaluated to level 2, text reads *not specified*). Some habitats and species were evaluated for multiple specific threats separately and therefore listed multiple times below. See Appendix E for additional information on specific threats and rankings.

Habitat	IUCN Level 2	Overall Threat Score
Coldwater rivers and streams	Logging & wood harvesting	M
Estuarine	Fishing & harvesting aquatic resources	M
Lowland Spruce-Fir Forest	Logging & wood harvesting	H
Lowland Spruce-Fir Forest	Not Specified	M
Marine	Fishing & harvesting aquatic resources	H
Marine	Not Specified	M
Northern Swamp	Logging & wood harvesting	M
Pine Barrens	Logging & wood harvesting	M
Temperate Swamp	Logging & wood harvesting	M

Common Name	IUCN Level 2	Overall Threat Score
Alewife	Fishing & harvesting aquatic resources	M
American Marten	Hunting & collecting terrestrial animals	M
American Marten	Logging & wood harvesting	M
American Oysters	Fishing & harvesting aquatic resources	M
Atlantic Sea Scallop	Fishing & harvesting aquatic resources	H
Atlantic Sea Scallop	Not Specified	M
Bald Eagle	Hunting & collecting terrestrial animals	M
Bald Eagle	Not Specified	H
Bay-breasted Warbler	Logging & wood harvesting	H
Blanding's Turtle	Hunting & collecting terrestrial animals	M
Canada Warbler	Logging & wood harvesting	M
Cape May Warbler	Logging & wood harvesting	H
Common Loon	Not Specified	H
Common Tern	Fishing & harvesting aquatic resources	M
Golden Eagle	Hunting & collecting terrestrial animals	M
Golden Eagle	Not Specified	H
Hognose Snake	Hunting & collecting terrestrial animals	M
Horseshoe Crab	Fishing & harvesting aquatic resources	M
Horseshoe Crab	Not Specified	M
Lynx	Hunting & collecting terrestrial animals	H
Lynx	Logging & wood harvesting	M
Northern black racer	Hunting & collecting terrestrial animals	M

Northern black racer	Logging & wood harvesting	M
Northern Shrimp	Fishing & harvesting aquatic resources	H
Northern Shrimp	Not Specified	M
Purple Finch	Logging & wood harvesting	M
Rainbow Smelt (diadromous)	Fishing & harvesting aquatic resources	M
Red Knot	Fishing & harvesting aquatic resources	M
Roseate Tern	Fishing & harvesting aquatic resources	M
Scarlet Tanager	Logging & wood harvesting	M
Softshell Clam	Fishing & harvesting aquatic resources	H
Softshell Clam	Not Specified	M
Spotted Turtle	Hunting & collecting terrestrial animals	M
Spruce Grouse	Logging & wood harvesting	H
Timber Rattlesnake	Hunting & collecting terrestrial animals	H
Timber Rattlesnake	Logging & wood harvesting	M
Veery	Logging & wood harvesting	M
Wood Thrush	Logging & wood harvesting	M
Wood Turtle	Hunting & collecting terrestrial animals	M

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