

Wood Turtle

Glyptemys insculpta

Federal Listing	N/A
State Listing	SC
Global Rank	
State Rank	S3
Regional Status	Very High



Photo by Ethan Nedeau

Justification (Reason for Concern in NH)

The wood turtle is a species of high regional concern (conservation concern and high regional responsibility) in the northeast that warrants federal endangered or threatened species listing considerations (NEPARC 2010, Therres 1999). Many states across the species range have reported declines, population structures with a disproportionate number of adults, or local extirpations (Ross et al. 1991, Garber and Burger 1995, Ernst 2001a, Daigle and Jutras 2005, Willoughby et al. 2013). In New England, the wood turtle is listed as a species of special concern in Maine (Hunter et al. 1999), Massachusetts (Massachusetts Natural Heritage and Endangered Species Program 2007), Connecticut (Connecticut Department of Energy and Environmental Protection 2014), New Hampshire, and Vermont (Vermont Nongame and Natural Heritage Program 2013). Historically, wood turtles were considered one of the most common turtle species in New Hampshire (Oliver and Bailey 1939). A petition to list the wood turtle as threatened under the Endangered Species Act by the Federal government was declined in the mid-1990s; the U.S. Fish and Wildlife Service stated the petition did not present “substantial scientific or commercial information indicating that listing the species is warranted” (USFWS 1995). Life history traits including late sexual maturation (Ontario: 17-18 years, Brooks et al. 1992) and limited fecundity (Garber 1989, Farrell and Graham 1991, Ross et al. 1991, Brooks et al. 1992) make wood turtles extremely vulnerable to increased adult mortality. Wood turtles depend on high rates of adult survival to compensate for a large mortality in the early stages of life. A model developed by Compton (1999) predicted that the annual removal of only 2 adult wood turtles from a stable population of 100 individuals would result in the extirpation of the population in less than 80 years. Human populations are rapidly expanding in New Hampshire (Society for the Protection of New Hampshire Forests 2005). As a result, residential and commercial development and human recreation opportunities are increasing, likely reducing the local viability of wood turtle populations (Tuttle and Carroll 1997, M. N. Marchand, personal observation).

Distribution

The wood turtles range extends from Maine to Minnesota, south to Virginia and Iowa in the United States, as well as southern Canada from Nova Scotia to Ontario (Ernst et al. 1994). The northeast United States comprises a significant portion of the wood turtle’s global range (Therres 1999). Wood turtles appear to be distributed throughout New England, but are less common in coastal zones (Klemens 1993) and absent from offshore islands (Jones 2007).

In New Hampshire, wood turtles likely occur throughout much of the state excluding higher altitudes such as the White Mountains Region (Taylor 1993, New Hampshire Natural Heritage Bureau 2005). High elevation records for southern New England include 442 m (1450 ft) at Norfolk, Connecticut, 497 m (1630 ft) Becket, Massachusetts, and 518 m (1700 ft) Plainfield, Massachusetts (Klemens 1993).

Appendix A: Reptiles

Scarcity of deep, low gradient streams may be the limiting factor at high elevation as opposed to altitude (Klemens 1993).

Habitat

Wood turtles (*Glyptemys insculpta*) are associated with rivers and streams with hard sand or gravel substrate (Ernst et al. 1994), but make extensive use of surrounding uplands during the summer (Compton et al. 2002, Tuttle and Carroll 2003, Arvisais et al. 2004). Most wood turtle terrestrial activity often is within 300 m of streams and rivers (Kaufmann 1992, Arvisais et al. 2002, Remsburg et al. 2006). Habitat use and home range may vary among individuals of a local population (Kaufmann 1992, Compton 2002) with females generally moving greater distances than males (Jones et al. 2014). A mosaic of river or streams, forest, dense shrub thickets, and bare sandy substrate, may attract turtles and provide habitat for a higher density of turtles in these areas (Kaufmann 1992). In Maine, activity areas of wood turtles were near streams and rivers and had moderate forest cover (Compton et al. 2002). Within activity areas, wood turtles in Maine selected areas that were near water, non-forested, and with low canopy cover (Compton et al. 2002). Compton et al. (2002) and Arvisais et al. (2004) attributed this difference in selection at the 2 spatial scales to a preference for forest edges, where sunlight penetration and plant growth favors abundant basking and feeding opportunities. Some anthropogenic disturbances (e.g., agriculture, hayfields, abandoned gravel pits) may also provide habitat heterogeneity that wood turtles prefer.

Wood turtles can be found closer to the river after emerging from hibernation in late April and May (Tuttle 1995). At this time and throughout the summer, dense riparian and early successional shrub thickets are extremely important cover (Kaufmann 1992, Compton 2002, Arvisais et al. 2004). Alder (*Alnus spp.*), dogwoods (*Cornus spp.*), and arrowwood (*Viburnum spp.*) are good cover plants along riparian areas and other edges (D. Carroll, personal communication). A mixture of herbs and grasses (e.g., meadow-sweet, *Spiraea latifolia*, goldenrod *Solidago spp.*), shrubs (e.g., dogwoods), and vines (e.g., Virginia creeper *Parthenocissus quinquefolia*, grape *Vitis spp.*) reduce detection from humans and other predators and provides an abundance of food for the turtles (D. Carroll, personal communication). Food resources include green leaves, algae, mosses, fruit, fungi, seeds, insects and a variety of animal matter, including carrion, eggs, earthworms, mollusks, tadpoles, and newborn mice (Oliver and Bailey 1939, Harding and Bloomer 1979, Ernst et al. 1994, Niederberer and Siedel 1999). Emergent marshes, swamps, and vernal pools may be used during spring and summer (Hunter et al. 1999, Arvisais et al. 2004). At night wood turtles enter shallow forms under grass, leaves and brush, fallen logs, and flood debris (Harding and Bloomer 1979, Ernst 1986, Farrell and Graham 1991). For thermoregulation, Dubois et al. (2009) illustrated that wood turtles energetically benefit from a semi-aquatic lifestyle, entering rivers at night when terrestrial air temperatures fall below that of water temperatures.

Female wood turtles lay eggs during late May to early July in sparsely vegetated, sandy-gravelly well-drained soils, often near water (Harding and Bloomer 1979, Klemens 1993, Buech et al. 1997). Natural (e.g., sandbars, sandy banks) and anthropogenic (e.g., gravel and sand pits, railroad beds) sites may be used to excavate nests (Brooks et al. 1992, Tuttle and Carroll 1997, Buech et al. 1997). Hatchlings emerge from the nest chamber between mid-August and early October (Ernst et al. 1994) and tend to move down-slope to the safety of rivers or shaded canopy using vision, olfaction, auditory cues, and positive geotaxis (Tuttle and Carroll 2005).

Turtles begin to return to the river daily in September and October before settling into hibernation before mid-November (Tuttle 1995). Hibernation sites include undercut banks, submerged tree snags and woody debris in rivers, wildlife burrows, and deep pools (Garber 1989, Ernst and McBreen 1991). Most wood turtles hibernate in the same location annually (Garber 1988) and may hibernate

Appendix A: Reptiles

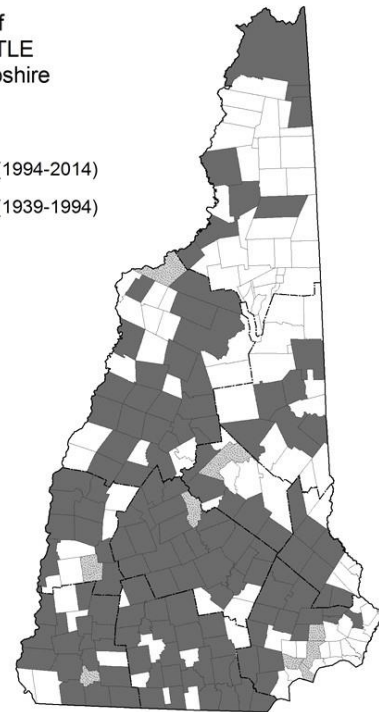
communally (Harding and Bloomer 1979).

NH Wildlife Action Plan Habitats

- Coldwater Rivers and Streams
- Floodplain Habitats
- Grasslands
- Shrublands
- Warmwater Rivers and Streams

Distribution of
WOOD TURTLE
in New Hampshire

■ Current (1994-2014)
■ Historic (1939-1994)



Distribution Map

Current Species and Habitat Condition in New Hampshire

There have been 88 corroborated occurrences of wood turtles in NH and 4,627 km of modeled stream habitat. Statewide, 33% of the landscape is in optimal habitat condition and 36% of stream habitat is potentially impaired (Jones et al. 2014).

Population Management Status

NHFG will participate in the Northeast Regional Conservation Needs Program (Status and Conservation of the Wood Turtle in the Northeastern United States) through State Wildlife Grants. Statewide surveys will be conducted starting in 2015 to assess the condition of wood turtle populations in the state. Independent researchers (e.g., David Carroll, Mike Jones) and universities (Umass, St. Anselm College, Plymouth State) have conducted local monitoring, mark-recapture, and radio telemetry studies.

Regulatory Protection (for explanations, see Appendix I)

- CITES - Convention on International Trade of Endangered Species of Wild Fauna and Flora
- NHFG Rule FIS 803.02. Importation.
- NHFG Rule FIS 804.02. Possession.
- NHFG Rule FIS 811.01 Sale of Reptiles.
- NHFG FIS 1400 Nongame special rules
- Fill and Dredge in Wetlands - NHDES

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- Rivers Management and Protection Program - NHDES
- Comprehensive Shoreland Protection Act - NHDES
- Alteration of Terrain Permitting - NHDES

Quality of Habitat

The following estimates are the percentages of wood turtle habitat in optimal landscape condition by county in New Hampshire: 34% in Belknap, 46% in Carroll, 42% in Cheshire, 45% in Coos, 45% in Grafton, 25% in Hillsborough, 34% in Merrimack, 4% in Rockingham, 7% in Strafford, and 44% in Sullivan (Jones et al. 2014). The following estimates are the percentages of wood turtle habitat that is potentially impaired by county in New Hampshire: 28% in Belknap, 22% in Carroll, 25% in Cheshire, 19% in Coos, 25% in Grafton, 48% in Hillsborough, 29% in Merrimack, 74% in Rockingham, 62% in Strafford, and 23% in Sullivan (Jones et al. 2014).

Habitat Protection Status

The total area of known and potential wood turtle habitat protected in occupied watersheds ranged from 0 to 2,193 ha (mean = 518 ha). Only 29% (27 of 93) of occupied watersheds had more than 20% protection of wood turtle habitat, though a number of watersheds where wood turtles have not been documented have a greater degree of protection. The actual habitat quality of these protected areas is not known and should be ascertained. Also, areas listed as conservation land may not be protecting wood turtles because of permitted land or recreational uses. Therefore, protection status for wood turtles may be much lower than what is represented in the conservation lands data layer used for these analyses.

Habitat Management Status

There is no habitat management being conducted for the wood turtle by NHFG, although recommendations pertaining to wood turtles have been made to private landowners by NHFG. Habitat management will be initiated at priority wood turtle sites in future years under an existing USFWS multi-state competitive state wildlife grant.

Threats to this Species or Habitat in NH

Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a “medium” or “high” score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.

Habitat impacts from development of surrounding uplands (Threat Rank: High)

Residential and commercial development results in impervious surface and removal of natural vegetation, both of which result in loss of upland habitat for wood turtles. Conversion of disturbed sites (e.g., gravel pits) to impervious surfaces or manicured lawns reduces the quality of nesting habitat. Increased recreational opportunities (e.g., hiking trails, canoeing, and kayaking trails) along streams and rivers can result in removal of dense riparian vegetation and trampling of sandbars and other potential nesting areas.

Habitat loss and fragmentation is listed as the main threat for the decline of the wood turtle

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throughout its range (Kaufmann 1992, Ernst 2001a). Wood turtles utilize broad, level valleys in the northeast which are commercially and agriculturally converted at a high rate, thus facilitating population declines (Jones et al. 2014). In New Hampshire, large wetland systems are being bisected by development, especially in the southern portion of the state (Tuttle 1995) and the human population and associated development is rapidly expanding (Society for the Protection of New Hampshire Forests 2005). Wood turtles use upland habitats extensively during the summer (Ernst 1986, Kaufmann 1992, Tuttle and Carroll 2003, Arvais et al. 2004). Development and other habitat alterations within the summer activity range of wood turtles may result in mortality and injuries to wood turtles (Harding and Bloomer 1979, Saumure and Bider 1998, Marchand and Litvaitis 2004) and loss of vegetative cover making turtles more visible to predators and collectors.

Mortality from mowing and agricultural machinery and vehicles (Threat Rank: High)

The maintenance of agricultural crops and hayfields may result in collision with adult turtles using the area during the summer. The loss of individuals, especially adult females, can have a severe impact on the population due to the low recruitment of juveniles into the breeding population. However, compatible (i.e., individual turtles not killed) management of agricultural lands and hayfields near riparian areas may provide some beneficial foraging and nesting resources.

Observed impacts of agriculture on a wood turtle population, as compared to a forested population, include: lower numbers of juveniles, decreased growth during the second decade of life, and increased shell injury (Saumure and Bider 1998). A study by Erb and Jones (2011) found that mower blade height and style (i.e., sickle bar or rotary) have differential effects on turtle strikes, but crushing from mower tires may be the most significant cause of agricultural related mortality. Numerous wood turtles in New Hampshire have been found in hay pastures dead from apparent collision (M. Marchand, personal observation). Female wood turtles have been observed nesting in agricultural fields (Kaufmann 1992) increasing their risk for collision and potential loss of the nest.

Mortality of individuals from vehicles on roadways (Threat Rank: High)

New Hampshire's human population density and associated development is rapidly increasing (Society for Protection of New Hampshire Forests 2005). Increasing human population densities are associated with increasing road densities and traffic volume, and road widening. Turtles are relatively slow when traveling through upland habitat, and individual turtles are extremely vulnerable when crossing moderate to high traffic roads. Small annual losses of only 1 to several adult wood turtles may result in population extirpation.

Roads located near local turtle populations can lead to population declines via mortality of individuals and altered population structures, including skewed age or sex ratios (Ernst and McBreen 1991, Klemens 1989, Garber 1989, Marchand and Litvaitis 2004, Steen and Gibbs 2004). Sixty-seven percent of dead wood turtles reported in New Hampshire were located on roads (New Hampshire Natural Heritage Bureau 2005). There are 23 watersheds with no major roads in potential wood turtle habitat, but only 1 known occupied watershed without major roads. The mean number of stream road crossings per occupied watershed is 30. Jones et al. (2014) assert that despite a lack of baseline data, road mortality is likely the primary cause of population declines in the urbanized east coast.

Habitat degradation from dams that impound rivers and alter hydrology (Threat Rank: High)

The construction of dams may alter the natural flow of a stream. The impoundment of water and regulated release may reduce natural erosion processes that create nest sites, and flood any nests

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that are laid when water levels are low. Also, turtles hibernating in the undercut banks of streams may freeze when water discharge is stopped. Dams or ineffective culverts under roadways may impede the movement of turtles, fragmenting populations and reducing gene flow. Channelization of streams may also alter natural stream flow by increasing water velocity causing sections of river to be unusable for the wood turtle. Dredging may cause sediment loading in rivers, degrading water quality.

At a dam site in Maine, female wood turtles delayed nesting and eventually relocated their nest sites due to lack of water flow needed to maintain nesting areas (Compton 1999). Water releases resulted in the flooding of 25% of nests at the site each year. Flooding later in the season could result in a higher mortality rate of developing wood turtle embryos. In Québec, Canada, Saumure et al. (2007) observed dead juveniles entombed in a streambank after a dredging project with subsequent bank collapses and stabilizations.

Mortality from increased flooding of rivers and streams (Threat Rank: Medium)

Severe hot or cold temperatures can result in breeding, nesting, and overwintering phenology disruptions. Severe storms and flooding can degrade wood turtle habitat as well as cause the removal of individuals from a population via direct mortality or washing downstream.

The specific environmental triggers for breeding, nesting, and overwintering are not well understood, but thermal triggers and river ice-out are most widely assumed. Greaves and Litzgus (2007) reported that wood turtles in Ontario, Canada entered and exited hibernation between 4°C and 5°C. Erratic temperature swings and unusual weather patterns may be problematic for a species dependent on thermal cues, but this threat is poorly understood for wood turtles in New Hampshire. Flooding from severe storms may have similar impacts to wood turtles as that of Natural Systems Modifications (7.2 Dams and Water Management/Use) where erosion degrades habitat and increased stream flow may wash individuals downstream removing them from local populations (see Compton 1999, Saumure et al. 2007).

Mortality from casual collection of individuals from the wild or moving animals to a different location (Threat Rank: Medium)

Commercial collection of wood turtles for the pet trade has a profound influence on the extirpation of a wood turtle population. Wood turtles often hibernate in groups making them easy for collectors to target in the early spring when they bask on the banks of the river close to the water's edge before wandering into their summer ranges.

Illegal collection has eliminated entire populations of wood turtles in some areas and is considered a serious threat for the species (NatureServe 2014). The NHFG has no evidence of commercial collection of wood turtles in New Hampshire. However, reptile dealers have advertised wood turtles in New Hampshire in the past (Levell 2000). In 1992 a wood turtle sold for \$75, in 1994 a pair sold for \$275 (RESTORE: The North Woods et al. 1994). In the United States, the price of wood turtles has climbed from \$20 in the 1960's to over \$300 today (Jones et al. 2014). As the species becomes less common it is likely that the market value of illegally collected turtles will increase. Most states in the northeast have documented commercial collection of wood turtles with widespread evidence across the species range (Jones et al. 2014). Adults are collected more often because they are easiest to find, reducing the ability of the population to reproduce (Ernst 2001b).

Mortality from the commercial collection of individuals from the wild (Threat Rank: Medium)

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Mortality from subsidized or introduced predators (Threat Rank: Medium)

Adult, hatchling, and egg depredation is a major conservation concern for wood turtles. Hatchlings and nests seem to be the most frequently targeted by mid-sized mammalian predators and some birds.

In New Hampshire, Tuttle and Carroll (2005) documented hatchling predation by both an eastern chipmunk (*Tamias striatus*) and an avian species – possibly great blue heron (*Ardea herodias*). Other predators may include, but are not limited to; raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), fisher (*Martes pennanti*), skunk (*Mephitis mephitis*), bullfrog (*Lithobates catesbeianus*), raven (*Corvus corax*), and coyote (*Canis latrans*) (Harding and Bloomer 1979, Marchand et al. 2002, Wirsing et al. 2012, Jones et al. 2014, Paterson et al. 2014). Areas where human activity is high (i.e., recreation or landscape alteration), subsidized meso-predators, such as raccoons, may be higher in density and may increase predation pressure (Wirsing et al. 2012). Further, rivers and creeks have been shown to have higher predator densities, which may explain a study conducted by Paterson et al. (2012), where they found higher predation of hatchling wood turtles than swamp/marsh associated Blanding's turtles (*Emydoidea blandingii*). Adult depredation seems to be less common, but evidence of attempts has been documented in turtles with scarring, and missing limbs and tails (Hunter et al. 1999).

List of Lower Ranking Threats:

Mortality and species impacts from impervious surface run-off

Species impacts from competition (with introduced species)

Habitat degradation from introduced or invasive plants (Phragmites and Japanese knotweed)

Habitat conversion and degradation from bank stabilization

Mortality and disturbance from increased recreation (hiking, mountain biking, OHRV)

Mortality of individuals from forestry equipment

Habitat conversion due to development of nesting habitat

Actions to benefit this Species or Habitat in NH

Conserve priority wood turtle parcels

Primary Threat Addressed: Habitat impacts from development of surrounding uplands

Specific Threat (IUCN Threat Levels): Residential & commercial development

Objective:

Conserve priority wood turtle parcels

General Strategy:

Several priority wood turtle sites have been identified (Jones and Willey 2013) and additional monitoring is being conducted to inform a regional conservation plan. These sites will be updated over time as new information becomes available. Priority sites will be incorporated into NH Wildlife Action Plan revision maps and incorporated into state land conservation funding consideration (e.g., Aquatic Resource Mitigation Fund, LCHIP). NHFG staff will provide technical assistance to land trusts, NRCS, and towns in identifying and conserving priority parcels. NHFG staff will also provide technical assistance in developing management objectives compatible with wood turtle conservation.

Political Location:

Statewide

Watershed Location:

Statewide

Monitor wood turtle populations

Objective:

Implement long-term and rapid assessment monitoring using standardized regional protocol.

General Strategy:

Implement long-term and rapid assessment monitoring using standardized regional protocol (Jones et al. 2014). Rapid surveys should be used to gather additional information for sites with minimal information. Long-term monitoring should be implemented at all high priority sites and repeated every 5-10 years. Additional targeted monitoring could target nesting areas or habitat quality of particular stream reaches.

Political Location:

Statewide

Watershed Location:

Statewide

Mowing guidelines development and implementation

Primary Threat Addressed: Mortality from mowing and agricultural machinery and vehicles

Specific Threat (IUCN Threat Levels): Agriculture & aquaculture

Objective:

Develop guidelines for minimizing harm to wood turtles in areas where agricultural activities occur

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and implement guidelines by providing technical assistance to landowners.

General Strategy:

Mowing guidelines have been developed for wood turtles in other states. Guidelines should be developed for NH or NH should adopt guidelines developed within other states or the northeast region. Once guidelines are developed, NHFG should work with landowners at priority wood turtle sites to enhance habitat quality or minimize risk of mortality to turtles. NHFG should provide guidelines to partners (e.g., NRCS) that work with landowners.

Political Location:

Statewide

Watershed Location:

Statewide

Identify priority habitat at wood turtle sites.

Objective:

Identify priority wood turtle areas.

General Strategy:

Use a combination of habitat modelling, radiotelemetry, and site assessments to evaluate site conditions and importance for wood turtle populations. At priority sites where nesting areas not known, mature females should be tracked via radiotelemetry.

Political Location:

Statewide

Watershed Location:

Statewide

Maintain & enhance nesting habitat

Primary Threat Addressed: Habitat conversion due to development of nesting habitat

Specific Threat (IUCN Threat Levels): Residential & commercial development

Objective:

Create, enhance, and maintain multiple nesting areas at each priority wood turtle site.

General Strategy:

Nesting guidelines need to be developed for wood turtles. A complete overview of nest enhancement guidelines can be found in Guidelines for Nest Site Management and Creation within High Priority Blanding's Turtle Sites in the Northeastern United States available at blandingsturtle.org. Existing nesting areas should be identified, protected, and enhanced as necessary. Large disturbed areas, including active and abandoned excavation areas, are often important nesting areas for turtles when they occur in proximity to suitable wetlands. Loaming and planting excavated areas often reduces their suitability for nesting turtles and many other wildlife species (e.g., black racers, eastern hognose snake, New England cottontail, bank swallow, kingfisher, shrubland and grassland birds). Managers should use extreme caution when augmenting or restoring known nesting habitat for wood turtles and management should occur outside of the nesting and incubation period. In areas where nesting opportunities appear to be few, far from wetlands, or when turtles must cross roads to reach, new

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nesting areas may be created. Landowners and land managers are encouraged to work with NH Fish & Game to identify nest enhancement projects, especially in priority Blanding's turtle sites. Nesting area creation or management should be monitored using visual surveys or camera surveys to assess use and document threats to nesting turtles, eggs, or young (predation, disturbance, etc.). Nesting areas should be systematically surveyed every five years to ensure that tree species are not shading the area.

Political Location:

Statewide

Watershed Location:

Statewide

Minimize disturbance to wood turtles from recreational activities.

Primary Threat Addressed: Mortality and disturbance from increased recreation (hiking, mountain biking, OHRV)

Specific Threat (IUCN Threat Levels): Human intrusions & disturbance

Objective:

Minimize impacts of recreation on wood turtle populations by using recreation guidelines and incorporating species' needs into property management plans

General Strategy:

The potential negative influence of recreational trails on wood turtle populations may be reduced through a combination of management techniques. Recreation guidelines have not been developed for NH but similar concerns and management techniques are outlined in Guidelines for Recreational Areas within High Priority Blanding's Turtle Sites in the Northeastern United States available at blandingsturtle.org. Objectives and Guidelines for Recreational Trails in High Priority Blanding's Turtle Sites: 1. Prevent direct adult mortality caused by ATVs, OHRVs, trucks, bikes, etc. 2. Minimize disturbance of adults, particularly nesting females. 3. Minimize mortality of nests, hatchlings, and juvenile turtles. 4. Maintain the integrity of confirmed and potential nesting habitat. Specific actions could include: 1.) Seasonal closures of ATV/OHRV trails bisecting sensitive wetland areas and turtle movement corridors; 2.) seasonal (24 May to 4 July) or afternoon/evening (>16:00 h) closures to protect nesting females where trails bisect nesting habitat or nesting corridors; 3) Permanent closures of ATV/OHRV trails in known and potential nesting areas. 4) Increased, targeted law enforcement presence during sensitive time periods when turtle movements are frequent and relatively predictable (e.g., June); 5) Trail relocation to avoid bisecting sensitive wetland complexes and to avoid separating suitable wetland habitats from suitable nesting habitats. 6) Avoid placing hiking trails or sports fields in or adjacent to nesting areas.

Political Location:

Statewide

Watershed Location:

Statewide

Develop and promote the use of forestry guidelines in areas where wood turtles occur

Primary Threat Addressed: Mortality of individuals from forestry equipment

Specific Threat (IUCN Threat Levels): Biological resource use

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Objective:

Develop and encourage use of wood turtle forestry guidelines to minimize impacts to wood turtle populations.

General Strategy:

Forestry protocols have not been developed for wood turtles at this time so that would be needed first. Guidelines for Forestry Activities within High Priority Blanding's Turtle Sites in the Northeastern United States have been developed by the Northeast Blanding's turtle working group and are available at blandingsturtle.org.

Political Location:

Statewide

Watershed Location:

Statewide

Enforce wildlife regulations

Primary Threat Addressed: Mortality from the commercial collection of individuals from the wild

Specific Threat (IUCN Threat Levels): Biological resource use

Objective:

Enforce wildlife regulations pertaining to the illegal collection, possession, or sale of wood turtles in New Hampshire.

General Strategy:

In NH, it is illegal to kill, harm, possess, collect, or sell a wood turtle without a permit from the NHFG. Because the removal of individual wood turtles from the wild can impact local populations, enforcement of rules and laws pertaining to this species are particularly important. NHFG biologists will work with NHFG law enforcement staff to identify violations and enforcement actions. NHFG staff will also work with neighboring states to identify origin of animals during confiscations.

Political Location:

Statewide

Watershed Location:

Statewide

Outreach to landowners

Primary Threat Addressed: Mortality from casual collection of individuals from the wild or moving animals to a different location

Specific Threat (IUCN Threat Levels): Biological resource use

Objective:

Provide information on the status and risks of species via various media outlets to educate public on importance of not collecting or moving turtles.

General Strategy:

NHFG will increase landowner knowledge of the species' status and threats by developing materials and messages on various media including Facebook, NHFG webpage, and press releases to other

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media outlets (newspaper, radio, television).

Political Location:

Statewide

Watershed Location:

Statewide

Minimize road mortality to wood turtles

Primary Threat Addressed: Mortality of individuals from vehicles on roadways

Specific Threat (IUCN Threat Levels): Transportation & service corridors

Objective:

Minimize mortality of wood turtles on roadways.

General Strategy:

NHFG will work with NHDOT, NHDES, towns, and other partners to minimize road mortality of wood turtles on roadways. Specific targeted actions will include: avoid placement of new roads in priority wood turtle landscapes, avoid upgrading unpaved roads to paved surfaces in priority wood turtle landscapes, designing roadways to minimize mortality such as avoiding use of steep curbing, upgrading culverts/underpasses to increase opportunities for safe passage of turtles, place turtle crossing signs to educate motorists in priority wood turtle areas, and manage vehicle speed by reducing speed limits or installing speed bumps. Priority landscapes for implementation will need to be assessed using a combination of habitat modelling, turtle road crossing data, and local knowledge.

Political Location:

Statewide

Watershed Location:

Statewide

Regional coordination

Objective:

Coordinate with other regional, national, or international initiatives to conserve wood turtles.

General Strategy:

A northeast wood turtle working group was formed during the development of a regional wood turtle status assessment (Jones et al. 2014). This working group has continued as part of a competitive state wildlife focused on conservation planning and priority action implementation for wood turtles in the northeast. NHFG will continue to participate in these regional, national, or international discussions and meetings to further the conservation purposes of wood turtles.

Political Location:

Watershed Location:

Evaluate impacts and develop environmental review guidelines

Primary Threat Addressed: Habitat impacts from development of surrounding uplands

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Specific Threat (IUCN Threat Levels): Residential & commercial development

Objective:

Evaluate all projects that have potential to cause harm to wood turtle populations and provide guidance to minimize impacts to those populations.

General Strategy:

NHFG will review proposed activities (residential and commercial development, recreation, bridge replacement, dam licensing, habitat management, etc) that has the potential to harm wood turtles. NHFG will work with applicants and permitting staff from other state and federal agencies, primarily Department of Environmental Services (Wetlands Bureau) and U.S. Army Corps of Engineers, to identify avoidance and minimization conditions for permit applicants. NHFG will develop guidelines for consistent and effective review of projects potentially impacting wood turtles. Guidelines will consider scenarios where impacts should be avoided and scenarios where impact minimization of mitigation may be appropriate. Pre- and post- construction monitoring of wood turtles and associated habitat (e.g., floodplains, nesting areas) should be considered as a component of project review. Protection should be prioritized according to condition of habitat and wood turtle population.

Political Location:

Statewide

Watershed Location:

Statewide

References, Data Sources and Authors

Data Sources

Habitat information came from the Northeast Wood Turtle Working Group (2011), peer-reviewed literature, and a wood turtle species viability report conducted by the White Mountain National Forest (unpublished document, originally prepared by K. Marchowsky 2001; revised by M. Marchand 2002). The Reptile and Amphibian Reporting Program (RAARP), Wildlife Sightings, and NHHNB databases were used to assess distribution. Neighboring state websites were consulted for recent distribution information. Habitat maps were produced by NHFG using available GIS data layers from various sources (metadata available upon request).

The Northeast Wood Turtle Working Group (2011) as part of the Regional Conservation Needs (RCN) report, Status and Conservation of the Wood Turtle (Jones et al. 2014), used a “corroborated occurrence” method to amalgamate multiple occurrences, sightings, specimens, and observations (within 2 km of each other and ≤ 30 years apart) along the same section of stream habitat. This effort was implemented to minimize pseudoreplication with individual turtles that may have been displaced by floods, migrated long distances, or released from captivity. Data for this analysis was provided by NHFG and the New Hampshire Natural Heritage Bureau, Forest and Lands Program, Department of Resources and Economic Development (DRED). Other datasets were received from B. Wicklow, Jones and Sievert, Jones and Willey, and several museums. There were 88 corroborated occurrences in New Hampshire. Further condition information was obtained from the NHHNB Element Occurrence database. Threat assessments were conducted by a group of NHFG biologists (Michael Marchand, Brendan Clifford, Loren Valliere, Josh Megysej).

Data Quality

Observations from RAARP and Wildlife Sightings were reviewed for quality before inclusion. However,

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distribution information is not complete, and new town records are likely. Information has been collected on a few populations by researchers (i.e., Michael T. Jones) conducting mark-recapture studies, and Tuttle and Carroll (1997, 2003) conducted an intensive population study for NHFG in the early 1990s.

Wood turtle may occupy many of the available watersheds in the state, but only portions of watersheds have been documented (93 known of 319 potential), and only a few populations have been studied in detail through mark-recapture and radio telemetry.

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