# MASSACHUSETTS FORESTRY CONSERVATION MANAGEMENT PRACTICES FOR BLANDING'S TURTLES

## August 2007 revised December 2016


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CMPs are meant to serve as guidelines for landowners and consulting foresters to aid in development of M.G.L. Chapter 132 Forest Cutting Plans that are compliant with provisions of the Massachusetts Endangered Species Act (MESA) (M.G.L. 131A) and its implementing regulations (321 CMR 10.00). In some cases, actual practices required for compliance with MESA may differ from published CMPs. Adherence to CMPs during forestry projects shall not necessarily constitute compliance with other state laws, or with local and federal laws.

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# SUMMARY

The Blanding's Turtle (*Emydoidea blandingii)* is a medium sized turtle recognizable by its yellow throat. Blanding's Turtles require both aquatic and terrestrial habitat to complete their life cycle. Overwintering sites are located in wetlands where Blanding's Turtles hibernate singly or in groups. Vernal pools are used in the spring for foraging and mating. During the summer, upland forest is used for estivation, which is a period of dormancy or reduced activity. During a single activity season, a Blanding's Turtle may use a variety of different wetlands and overland movements can be extensive between different habitats or wetland features.

The primary threats timber harvesting pose within Blanding's Turtle habitat is direct mortality of adults due to crushing by motorized vehicles. A secondary concern is habitat modification surrounding vernal pools and other wetlands. To avoid direct mortality, it is required that access to the harvesting site with motorized vehicles be restricted to when the Blanding's Turtles are inactive during the winter and are overwintering in deep marshes. Accordingly, seasonal harvest restrictions will apply to Blanding's Turtle Priority Habitat (i.e. late fall – early spring harvest window). In order to maintain vernal pool habitat, retaining $\geq$ 65% canopy cover within 100 feet of vernal pools is required. In order to maintain the structural integrity of overwintering sites, wetland harvesting by hand-felling is required and crossing wetlands with standing water must be done with temporary bridges or only occur under frozen ground conditions. New landings and skid roads must be located as far away as possible from overwintering wetlands and at least 100 feet from vernal pools.

## The Role of Forestry in the Conservation of Blanding's Turtles

Maintaining forested land in forest use is vital to conserving viable populations of Blanding's Turtles. In addition, timber harvesting is often essential for private forestlands to remain economically viable, and is necessary for public and private forestlands supplying renewable wood products to sustain local economies. However, forest managers need to recognize that harvesting can potentially result in direct mortality to individual turtles, and should look to conserve Blanding's Turtles and other rare species proactively, in order to maintain the integrity of forest ecosystems.

For foresters and forest landowners who are interested in receiving additional guidance on how to incorporate rare species into their forest management planning process, the Natural Heritage and Endangered Species Program recommends filing a Forestry Information Request Form and pre-filing consultation request to discuss the intended forest management and rare species at a given site with a review biologist by contacting Brent Powers, NHESP Review Biologist at, 508-389-6354. For more information please see the links below to the program's website.

Forestry Review under the MESA - http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/forestry-rare-species-review/

Forestry Information Request Form - http://www.mass.gov/eea/docs/dfg/nhesp/regulatory-review/forestry-info-request-form.pdf

## CONDENSED VERSION OF THE FORESTRY CONSERVATION MANAGEMENT PRACTICES FOR BLANDING'S TURTLES

For the full version of the forestry conservation management practices including management objectives and the rationale supporting them, see page 15.

**Species Identification and Biology -** The Blanding's Turtle is a medium sized turtle recognized by its yellow throat, smooth spotted upper shell and hinged lower shell. In Massachusetts, it is found primarily in the northeast area of the state in association with various types of wetlands. During the Blanding's Turtle active season, turtles make many overland movements between different wetlands. These turtles begin to reproduce between the ages of 14 and 20 years and can live to at least 75 years.

**Forestry Practices** - Turtle conservation in general requires minimizing all sources of adult mortality. Blanding's Turtles specifically require maintenance of forest floor conditions surrounding vernal pools. These management practices apply to Blanding's Turtle Priority Habitat and were made with the assumption that forestry equipment would only enter a site once per decade.

**R –** required management practice **G –** guideline or recommended management practice

---

**R** Wetlands shall be temporarily bridged or crossed only when frozen solid. This will help prevent substrate compression and direct mortality of turtles that are overwintering in the wetland.

**R** Acceptable wetland harvesting shall be done by hand-felling and removing trees by winching or through the use of machinery capable of reaching into the wetland with a mechanical boom/arm (i.e. feller buncher type machinery) so that no motorized vehicles enter the wetland. This will prevent any direct mortality of turtles that are overwintering in the wetland as well as maintain the structural integrity of the habitat.

**R** Motorized vehicle use, consistent with the Massachusetts Forestry Best Management Practices[1], within Priority Habitat for Blanding's Turtles may proceed according to the following time and distance requirements:

| Distance from Wetland, Waterbody or Vernal Pool (feet) | Time periods when access with motorized vehicles can occur |
|---|---|
| 0 – 300* | October 15th – March 15th |

*Distance restrictions may be extended beyond 300 feet to a maximum of 1000 feet for habitat features such as wetlands, nesting and early-successional habitats.

**R** For harvesting within wetlands that is consistent with the Massachusetts Forestry Best Management Practices[1], the trees that will be harvested shall be marked prior to cutting plan approval and harvesting.

**R** No harvesting shall occur in either Certified vernal pools or uncertified vernal pools.

[1] Massachusetts Forestry Best Management Practices Manual, Revised 2013 for specific requirements.

**R** New landings and skid roads shall be located at least 100 feet away or farther if possible, from wetlands, including both Certified and uncertified vernal pools.

**R** 0 – 50 feet from Certified and uncertified vernal pool high water mark: Retain a 50-foot no cut filter strip.

50 – 100 feet from Certified and uncertified vernal pool high water mark: Retain ≥ 65% canopy cover

(see tables in Appendix for residual basal area requirements equivalent to 65% canopy cover)

**R** The 50-foot no cut buffer boundary shall be clearly identified by flagging or marking paint prior to cutting plan approval and harvesting. No trees shall be cut or harvested within this area.

**R** If harvesting will occur within 50 - 100 feet of vernal pools and the canopy cover within the whole area will be maintained at ≥ 75%, than the boundary of the 100-foot management area from the vernal pool does not need to be identified by flagging or marking prior to cutting plan approval and harvesting. The trees that will be harvested within this management area shall be marked prior to cutting plan approval and harvesting.

**G** Leave limbs and tops in the forest, consistent with other laws, regulations, and forestry best management practices, in order to provide cover areas with cooler microclimates.

# SPECIES BIOLOGY

**BLANDING'S TURTLE: The yellow-throated turtle found in and near wetland complexes**

## Species Identification

**Blanding's Turtle Biology**
**Quick Reference Chart**

**Adult size (carapace length):** 6.4 - 8.9 in (16 - 22cm)

**Size at sexual maturity:** 6.4 in (16.3 cm)

**Number of years to reach sexual maturity:** 14 - 20

**Clutch size:** 3 - 22 eggs (average = 10 - 15 eggs)

**Hatchling size (carapace length):** 1.1 - 1.5 inches (3 - 3.9 cm)

**Annual adult survival rate:** 96%

**Life span:** can be up to 77 years

**Coloration of shell and skin:** upper shell black with yellow slightly radiating lines or spots; lower shell yellow with large, black blotches at the outer posterior corner to completely black; and skin is blue-gray

**Shell characteristics:** smooth upper shell, lower shell hinged, lacks a buttress between the upper and lower shells

The Blanding's Turtle is a medium-sized turtle that has a yellow throat and an elongated, smooth upper shell (carapace) with yellow or tan irregular spots or radiating lines. The lower shell (plastron) is yellow with large black blotches on the outer posterior corner of each scute (scale). In older individuals, the entire plastron may be black. The skin is usually blue-gray. Blanding's Turtles have a long neck and webbed feet.

Males and females can be distinguished by looking at a number of different characteristics. Males have slightly concave plastrons, while females have flat or convex plastrons. The tails of males are thicker and the vent (the common orifice through which the contents of the digestive, reproductive and urinary systems are discharged) on the tail in males is located beyond the edge of the carapace. Hatchlings have a keeled carapace that is dark brown to black, and occasionally has irregular spots.

**Figure 1.** The most distinguishing characteristic of Blanding's Turtles is their yellow throat.

**Figure 2**. Blanding's Turtles can also be recognized by their smooth dark shell dotted by yellow spots.

### Life Span and Time to Maturity

The approximate age of Blanding's Turtles can be determined by counting the number of growth rings on the scutes of the plastron. These rings are laid down annually. On older individuals, this method becomes very speculative because of slowed growth and scute wear. Most Blanding's Turtles begin to reproduce between the ages of 14 and 20 years. Sexual maturity for female Blanding's Turtle occurs at a carapace length of approximately 6.4 inches. Blanding's Turtles living in the wild have been known to survive up to 77 years.

## Similar Species in Massachusetts

The only turtle species that might be confused with the Blanding's Turtle in Massachusetts are the Spotted Turtle and the Box Turtle. The Blanding's Turtle is similar to these two turtle species in that it also has yellow markings on its shell. However, these markings are not dots like the Spotted Turtle but rather flecks of color. The Box Turtle has a prominent mid-line ridge (keel) on the carapace. Adult Blanding's Turtles are larger than Spotted Turtles and Box Turtles. The carapace of the Blanding's Turtle and Box Turtle has a more domed shape than the Spotted Turtle. The plastron of the Blanding's Turtle and Box Turtle is hinged and the Spotted Turtle's is not. Blanding's Turtle plastron color ranges from yellow with dark blotches on the exterior, posterior corner of each scute to completely black (older individuals). In contrast, the Box Turtle has a yellow plastron; some individuals may have black blotches on the interior edges of the scutes. The Blanding's Turtles also have a distinct yellow throat and neck and the Box Turtle has a yellow lower jaw, but a dark throat and neck.

## Blanding's Turtle Range

The Blanding's Turtle core range is in the Great Lakes region and extends to Kansas (Ernst et al., 1994). In addition, several smaller, disjunct populations occur in the East: in the lower Hudson River Valley of New York, in southern Nova Scotia, and in an arc extending from eastern Massachusetts through southeastern New Hampshire to southern Maine. Massachusetts populations all occur east of Worcester, in areas with high human population density and high development pressure. The known occurrences of Blanding's Turtles in Massachusetts are shown in Figure 3.

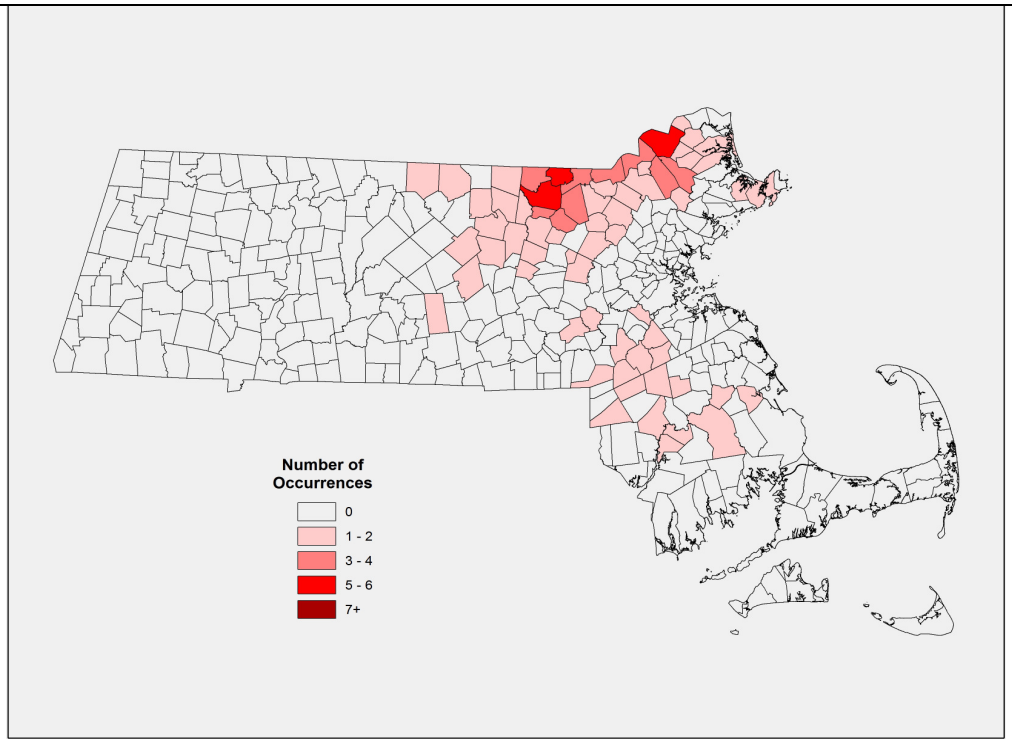


**Figure 3.** Documented occurrences of Blanding's Turtles per town in Massachusetts over the past 25 years. Each occurrence in the Natural Heritage database represents a population.

**Blanding's Turtle Movements and Home Range**

Blanding's Turtles move more regularly and farther across upland habitat than other freshwater turtles in New England. During their active season they often use multiple wetlands in order to access foraging, mating, nesting, estivation, and overwintering habitats. Therefore, they make numerous overland movements. In Maine, a population of Blanding's Turtles previously studied uses an average of 6.7 wetlands and moves across upland habitat an average of 8.5 times a year (Beaudry et al., 2006). In Massachusetts, the average length of a Blanding's Turtle home range is 2800 feet and the maximum is over 10,000 feet (Grgurovic and Sievert, 2005). Movements during the spring from permanent to ephemeral wetlands are more extensive than travel in the summer and fall, but even in the late summer and fall average home range length in MA is 930 feet. Similarly, Blanding's Turtle populations in New Hampshire were observed making significant movements in late summer and fall (Innes et al. 2008). Female Blanding's Turtles in various states have been observed to travel from over 500 feet to over 5000 feet in order to nest (Table 1). Movements between wetlands in Maine and Minnesota averaged over 2000 feet with the maximum distance moved between wetlands greater than 6500 feet (Joyal et al., 2001; Piepgras et al., 1998). Even hatchling Blanding's Turtles moved an average of 613 feet and up to 1478 feet from their nest to water in late August and early September (Butler and Graham, 1995). In Massachusetts, a two year study of Blanding's Turtles found that the annual home ranges had little overlap indicating that the amount of land required to sustain even a single turtle is quite extensive. The average home range size for males was 68 acres, for females 49 acres and the maximum home range size was 629 acres (Grgurovic and Sievert, 2005).

| | Straight-line distance moved from permanent wetland (feet) | | | | | | Home Range Length (feet) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Different Wetland | | Nesting | | Estivation | | Average | | Maximum | # | # | |
| Location | Avg | Max | Avg | Max | Avg | Max | Males | Females | Males | Turtles | Seasons | Source |
| Wisconsin | | | 551 | | | | | | | 8 | 1 | Ross and Anderson, 1990 |
| Maine | 2230 | 6724 | 794 | 1345 | 256 | 361 | | | | 29 | 2 | Joyal et al., 2001 |
| Minnesota | 3411 | 6590 | 1174 | 2719 | | | | | | 25 | 1 | Piepgras et al., 1998 |
| Minnesota | | | 1397 | 5278 | | | 2972* | | 9797 | 25 | 1 | Piepgras et al., 2000 |
| Michigan | | | 2460 | 3936 | | | | | | 35 | 6 | Congdon et al., 1983 |
| Illinois | | 4592 | 2673 | 2952 | | | 2066 | 2624 | | 8 | 1 | Rowe and Moll, 1991 |
| Massachusetts | | | | | | | 2840 | 2795 | 10496 | 50 | 2 | Grgurovic and Sievert, 2005 |

*average of male and female home range lengths

**Table 1.** Straight-line distances moved by Blanding's Turtles away from permanent wetlands to access different habitats and home range lengths.

## Life History of the Blanding's Turtle

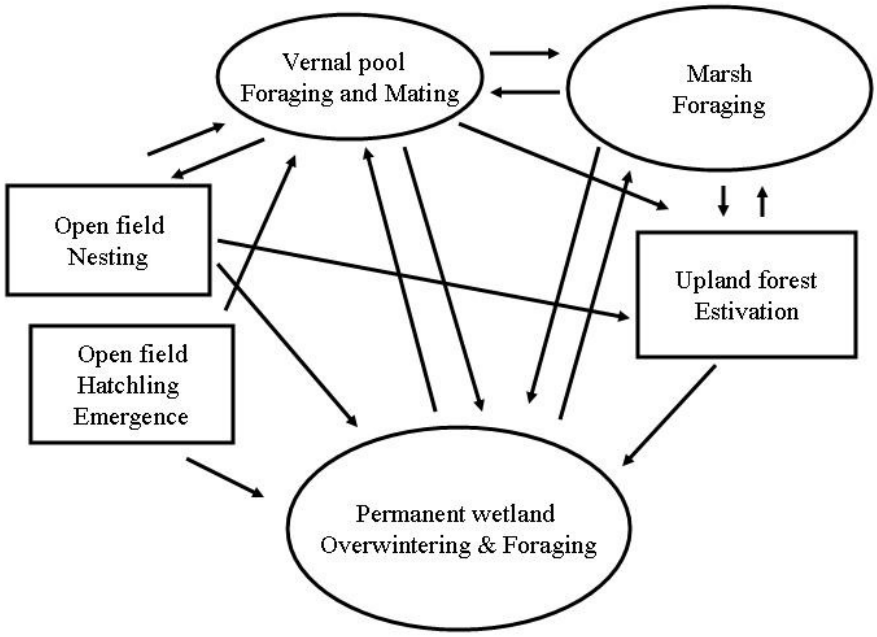


**Figure 4**. Diagram of habitats used by Blanding's Turtles. Ovals represent aquatic habitat and rectangles represent terrestrial habitat. Arrows indicate overland movements.

**Life History**
**Quick Reference Chart**

| WHAT | WHERE | WHEN |
|---|---|---|

| | | |
|---|---|---|
| Overwintering | Aquatic habitat: in organic substrate at the deepest sections in marshes, ponds, creeks and less frequently vernal pools | Late fall to early spring: November to late March |
| Spring activity | Aquatic habitat: vernal pools or saturated wetlands | Early spring: April |
| Terrestrial habitat use | Terrestrial habitat: deciduous forest, coniferous forest, mixed forests, fields | April to November – overland travel occurs throughout activity season, terrestrial estivation occurs from July to September |
| Courtship and mating | Aquatic habitat: vernal pools or saturated wetlands | Spring and summer – April to July |
| Nesting and hatchling emergence | Terrestrial habitat: open areas (often disturbed) with sandy/loamy upland soils, grasslands, cornfields, dirt roads, powerline right of ways, and early successional fields | Nesting – June<br>Hatchling emergence – August to mid-September |
| Foraging | Aquatic habitat: vernal pools, marshes, ponds, fens, streams, emergent wetlands, scrub-shrub wetlands, forested wetlands | April to November |

## Overwintering

Blanding's Turtles overwinter in a variety of wetland types. They will use wetlands ranging from forested swamps to vernal pools. Overwintering Blanding's Turtles will use organic substrate in the deepest parts of ponds, marshes, creeks and occasionally vernal pools. Some individuals overwinter under hummocks in red maple or highbush blueberry swamps. One study in Maine reported that 71% of their turtles overwintered in permanent wetlands (Joyal et al., 2001). Blanding's Turtles can be found overwintering in depths of mud substrate up to 3.7 - 8.3 inches. Some populations congregate at overwintering sites and to some extent hibernate communally (near each other).

## Spring Activity

Upon emergence from hibernation, Blanding's Turtles often move overland to vernal pools and scrub-shrub swamp wetlands where they forage and mate. Wetland vegetation is typically dominated by buttonbush, dogwood, winterberry, highbush blueberry, and arrowwood. Females will remain in wetland or vernal pool habitat until they begin nesting. All other Blanding's Turtles may remain in a vernal pool until it dries up, at which point they will move to a different vernal pool or wetland or begin estivation, a period of dormancy or reduced activity during the summer.

## Terrestrial Habitat Use

Terrestrial habitat use can occur anytime during the Blanding's Turtle activity season when individuals move between different types of wetlands or between a wetlands and nesting areas. The months when Blanding's Turtles are known to spend extended periods of time in terrestrial habitats are from June to September. It is during these months that females nest and estivate in upland forest or along forest/field edges. At night and during periods of hot weather, Blanding's Turtles retreat to "forms". These small terrestrial shelters are found beneath leaf litter, in the grass, under logs or brush located up to 361 feet from the nearest wetland. They are called forms because when the turtle leaves them, they retain the shape of the turtle's shell. A study of radio-tagged Blanding's Turtles in Maine found that individuals spent up to 38% of their time in uplands during their active season (Joyal et al., 2001).

### Reproduction- Courtship, mating, nesting and hatchling emergence

In Massachusetts, Blanding's Turtle courtship and mating occurs in the water in the spring and early summer. Females nest from late May to early July in open areas such as upland fields with well-drained loamy or sandy soils. Females will travel hundreds of feet to find appropriate nesting habitat (Table 1). Females begin nesting during the daylight and continue the process until after dark. Females can remain on land for up to a week during the nesting season. Nesting in Massachusetts has been observed in human altered habitats such as lawns, gardens, mulch piles and power line rights of ways (Grgurovic and Sievert, 2005). Blanding's Turtles have temperature-dependent sex determination. At cooler incubation temperatures, males are produced, while at warmer incubation temperatures females are produced. Hatchlings emerge in August and September.

### Foraging

Blanding's Turtles are omnivores, eating both plant and animal; although one study found that animal matter comprised 86% of their diet (Rowe 1992). Another study showed that individual turtles having primarily a carnivorous diet grow faster and reach a larger maximum adult size than do individuals with primarily an herbivorous diet. They eat while on land and in the water. The animal matter that is consumed, either alive or as carrion, includes snails, crayfish, earthworms, insects, golden shiners, brown bullheads and other small vertebrates. Vernal pools are an important source of many of these prey items. The plants that Blanding's Turtles have been known to eat include coontail, duckweed, bulrush and sedge.

## BLANDING'S TURTLE CONSERVATION CONCERNS

### Status Across Range

In Massachusetts, the Blanding's Turtle is listed as a Threatened Species. It is not listed at the federal level in the United States but it is listed as endangered at the federal level in Canada. Its status across its range is shown in Fig. 5. Historical evidence suggests that unlike Wood Turtles and Spotted Turtles, which were once quite common in Massachusetts, Blanding's Turtles have been rare in Massachusetts over at least the past century and a half (Storer 1839, Bumpus 1884-1886, Lamson 1935), although archeological evidence suggests they may have been relatively common in New England between 4000 and 500 years ago (Spiess and Sobolik 1997).

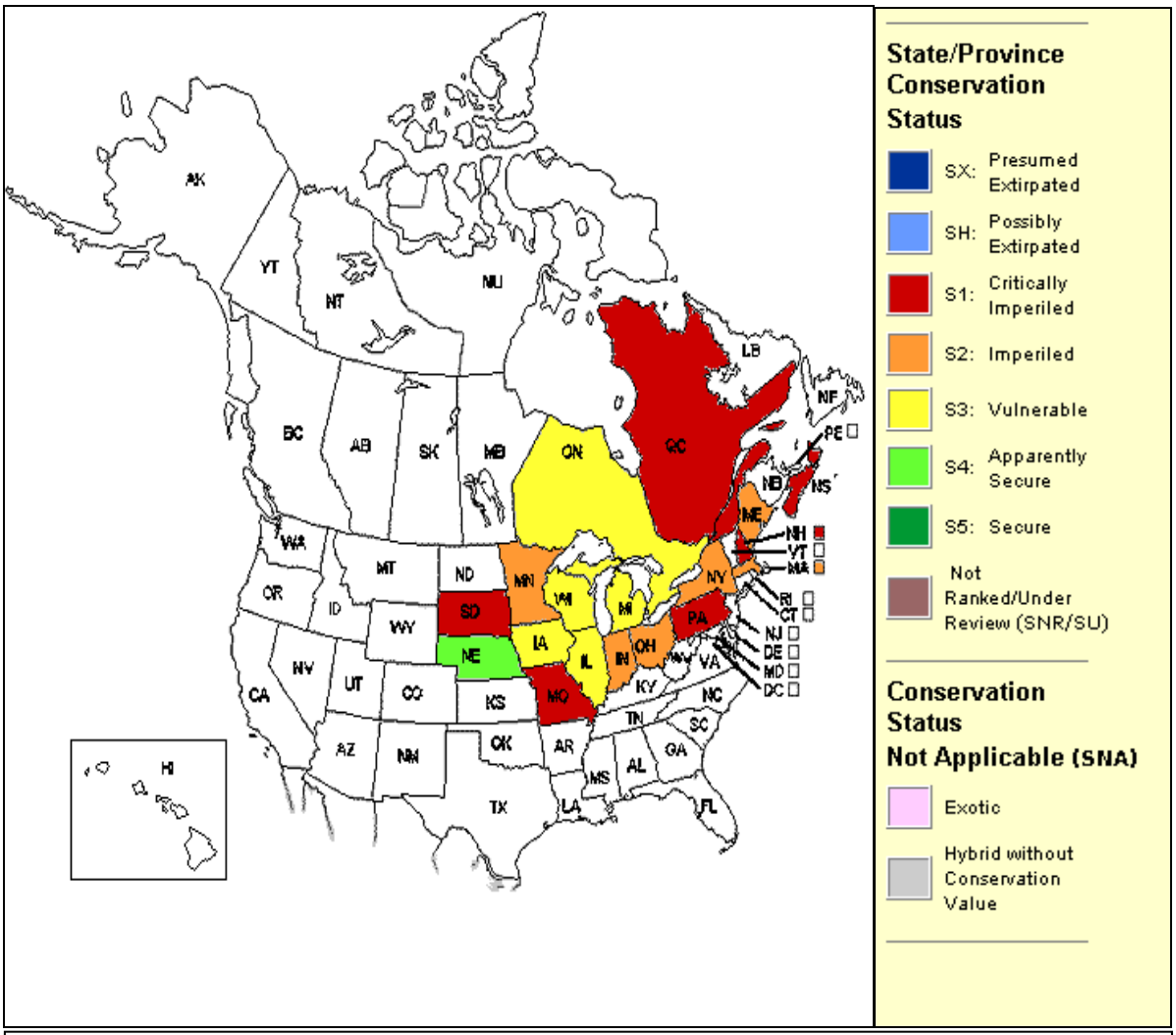


**Figure 5**. The status of Blanding's Turtle across their range (Nature Serve 2015)

## Turtle Population Biology

Turtle fossils date back over 200 million years to the Late Triassic period. Over time, turtles have evolved a reproductive strategy that makes them vulnerable to human disturbances. Hatchling survival from nests and juvenile survival is very low while the time to sexual maturity is long. These characteristics are compensated by adults being long-lived and reproducing multiple times. Increases in population size tend to take a long time and the potential time to recover from a population decline is also long.

The classic story of the tortoise and the hare is a useful comparison to think of when considering the reproductive strategies of turtles as compared to many mammal species. In the same way that the movement of the individual animals differs, so does the amount of time needed to reach sexual maturity. Hares can start reproducing within a year of being born, while many turtle species take a decade to become a reproductive adult. Therefore, the potential to increase the size of a mammal population such as the hare occurs over a much shorter time frame than for turtles. Similarly, recovery from a population decline can occur much faster for a mammal than for a turtle.

The chances for a long life are much better for the turtle than for the hare. The slow and steady adult turtle lives a much longer life. A long life together with multiple years of reproduction compensates for low rates of hatchling and juvenile survival in turtles. However, this reproductive strategy makes turtles exceptionally vulnerable to any disturbances that increase the rate of adult mortality. The survival of adult

turtles on an annual basis is typically greater than 95%. Long-term studies of turtle populations as well as models of population dynamics indicate that increased mortality rates of adults that are as low as 2-3% annually may be enough to lead to the ultimate loss of a local population.

## Activities that Impact Blanding's Turtle Populations

Habitat destruction, degradation or alteration, and fragmentation all threaten Blanding's Turtle populations. Turtles are also particularly vulnerable to any activity that consistently reduces adult survivorship on a yearly basis. For example, populations in which adults cross roads in order to access habitats needed for completion of their life cycle are at a higher risk of extirpation because of road kills. The specific activities outlined below are concerns for many turtle species as well as for Blanding's Turtles specifically.

## Roadkill

Mortality of turtles because of road kill is a concern for all North American turtle species. It is of particular concern for Blanding's Turtles since they have such long distance movements and multiple overland trips during their active season. Highways with high traffic volumes become impenetrable barriers that isolate turtle populations and prevent dispersing individuals from maintaining genetic diversity across populations. Even smaller roads with moderate traffic volumes can cause enough mortality to cause a population to decline.

A modeling study that investigated the effects of road density and traffic volumes on turtles found that for semi-terrestrial turtles such as the Blanding's Turtle, roads could contribute enough to annual adult mortality that positive population growth could not be maintained. Mortality rates greater than 5% were determined to cause decline in the size of local turtle populations based on previous long-term studies of various turtle species (Gibbs & Shriver, 2002).

## Predation

In recent decades, raccoon and skunk populations have benefited from the availability of additional food sources such as garbage, bird seed and food for pets, provided by humans in commercial and residential areas. These mammals as well as red foxes are efficient turtle nest predators. For turtle populations that border on areas developed for residential use, besides the direct loss of habitat, the increase in nest predators such as raccoons and skunks can be very detrimental to the hatching success of nests and greatly reduces the number of young turtles that are born and survive. Nest predation can destroy the majority of a turtle population's reproductive output on a yearly basis.

## Forestry

Maintaining forested habitat in association with vernal pools and wetlands is essential for the conservation of Blanding's Turtles. The impacts of timber harvesting are recognized as having significantly fewer lasting effects as compared to other permanent changes in land use, such as residential and commercial development. However, precautions should be taken during timber harvesting in order to maintain the long-term viability of Blanding's Turtle populations within forested areas by maintaining upland-wetland linkages (Attum et al. 2008).

The greatest concern during forestry operations are turtles being run over and crushed by motorized logging equipment. This could occur when turtles are moving between wetland types, nesting, estivating, or hatchlings are emerging and moving to wetlands. Direct mortality could also occur when wetlands are being harvested. Habitat modification surrounding vernal pools is also a concern.

# FORESTRY CONSERVATION MANAGEMENT PRACTICES FOR BLANDING'S TURTLES

The following management practices apply to Blanding's Turtle Priority Habitat. These recommendations were made with the assumption that motorized timber harvest equipment would only enter a site once per decade. Reducing the frequency that motorized vehicles enter Blanding's Turtle habitat would be beneficial in minimizing direct mortality of adults. For long-term management, heavier cuts spaced at longer intervals would be favored over lighter cuts at more frequent intervals, as long as the canopy cover around vernal pools is maintained. The canopy cover within 100 feet of vernal pools should be maintained at 65% or greater.

**R –** required management practice **G –**guideline or recommended management practice

## Preventing Turtle Mortality

Conservation management objective

Avoid direct mortality of Blanding's Turtles from any timber harvest activity involving motorized vehicles.

Rationale

Individual survival of long-lived adults is important since they need to reproduce many times before they replace themselves in the population. Potential mortality of adults is avoided by not using motorized vehicles in areas and at times when Blanding's Turtles will be present.

General management recommendations

Adjust the timing of motorized vehicle use for timber harvest activities, so that it occurs while Blanding's Turtles are inactive or less likely to be occupying terrestrial habitat.

Specific management practices

**R** Wetlands shall be temporarily bridged or crossed only when frozen solid. This will help prevent substrate compression and direct mortality of turtles that are overwintering in the wetland.

**R** Acceptable wetland harvesting shall be done by hand-felling and removing trees by winching or through the use of machinery capable of reaching into the wetland with a mechanical boom/arm (i.e. feller buncher type machinery) so that no motorized vehicles enter the wetland. This will prevent any direct mortality of turtles that are overwintering in the wetland as well as maintain the structural integrity of the habitat.

**R** Motorized vehicle use, consistent with the Massachusetts Forestry Best Management Practices, within Priority Habitat for Blanding's Turtles may proceed according to the following time and distance requirements:

| Distance from Wetland, Waterbody or Vernal Pool (feet) | Time periods when access with motorized vehicles can occur |
|---|---|
| 0 – 300 | October 15th – March 15th |

**R** For harvesting within wetlands that is consistent with the Massachusetts Forestry Best Management Practices, the trees that will be harvested shall be marked prior to cutting plan approval and harvesting.

## Maintaining Vernal Pool Habitat Integrity

Conservation management objective

Avoid altering vernal pool habitat and affecting the invertebrate and amphibian populations that are an important food source for Blanding's Turtles.

Rationale

Vernal pools are important habitats for Blanding's Turtles to complete their life cycle, providing foraging, breeding, and sometimes overwintering habitat. They are also used as "stepping stones" for Blanding's Turtles that are moving between different wetlands. It is beneficial to maintain shade, course woody debris, forest floor litter, and water quality within the pool, as well as eliminating any potential sources of sedimentation or erosion adjacent to vernal pools.

General management recommendations

Maintain a mostly closed-canopy forest and minimize forest floor disturbance within 200 feet of vernal pools.

Specific management practices

**R** No harvesting shall occur in either Certified vernal pools or uncertified vernal pools.

**R** New landings and skid roads shall be located at least 100 feet and farther away if possible, from wetlands, including both Certified and uncertified vernal pools.

**R** 0 – 50 feet from Certified and uncertified vernal pool high water mark: Retain a no cut filter strip.

50 – 100 feet from Certified and uncertified vernal pool high water mark: Retain ≥ 65% canopy cover.

(see tables in Appendix for residual basal area requirements equivalent to 65% canopy cover)

**R** The 50 foot no cut buffer boundary shall be clearly identified by flagging or marking paint prior to cutting plan approval and harvesting. No trees shall be cut or harvested within this area.

**R** If harvesting will occur within 50 - 100 feet of vernal pools and the canopy cover within the whole area will be maintained at ≥ 75%, than the boundary of the 100-foot management area from the vernal pool does not need to be identified by flagging or marking prior to cutting plan approval and harvesting. The trees that will be harvested within this management area shall be marked prior to cutting plan approval and harvesting.

**G** Leave limbs and tops in the forest, consistent with other laws, regulations, and forestry best management practices, in order to provide cover areas with cooler microclimates.

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# PHOTO CREDITS

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# APPENDIX

**Table 1. Draft residual basal area levels of trees >4 inch dbh sampled with a BAF-10 prism for 75% canopy cover within 0-100 ft of vernal pools in Blanding's Turtle Priority Habitat.**

| Average Stand dbh (inches) | Forest Type* | | | | | |
|---|---|---|---|---|---|---|
| | WP,WK,RP,SR,PP, HK, TK, CD, SF | WH, HH | BW, RM, BC, BB, SM, BM, BE | W0, PO | OH | OR, OM |
| 4 | 50 | 40 | 25 | 20 | 15 | 10 |
| 5 | 60 | 50 | 35 | 30 | 25 | 20 |
| 6 | 70 | 55 | 35 | 30 | 25 | 20 |
| 7 | 80 | 65 | 40 | 35 | 30 | 25 |
| 8 | 85 | 70 | 45 | 40 | 35 | 30 |
| 9 | 90 | 70 | 45 | 40 | 35 | 30 |
| 10 | 95 | 75 | 50 | 45 | 40 | 35 |
| 11 | 95 | 75 | 50 | 45 | 40 | 35 |
| 12 | 100 | 80 | 55 | 50 | 45 | 40 |
| 13 | 105 | 85 | 55 | 50 | 45 | 40 |
| 14 | 110 | 90 | 60 | 55 | 50 | 45 |
| 15 | 110 | 90 | 60 | 55 | 50 | 45 |
| 16 | 115 | 95 | 65 | 60 | 55 | 50 |
| 17 | 120 | 95 | 65 | 60 | 55 | 50 |
| 18 | 120 | 100 | 70 | 65 | 60 | 55 |
| 19 | 120 | 100 | 70 | 65 | 60 | 55 |
| 20 | 125 | 105 | 75 | 70 | 65 | 60 |
| 21 | 125 | 105 | 75 | 70 | 65 | 60 |
| 22 | 125 | 110 | 80 | 75 | 70 | 65 |
| 23 | 125 | 110 | 80 | 75 | 70 | 65 |
| 24 | 130 | 115 | 80 | 75 | 70 | 65 |
| 25 | 130 | 115 | 85 | 80 | 75 | 70 |
| 26 | 130 | 120 | 90 | 85 | 80 | 75 |

*Refer to Ch. 132 Forest Cutting Plan form for definition of forest types.