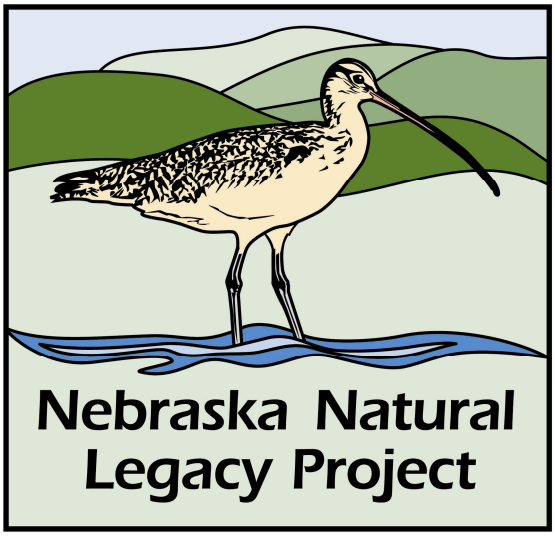
Blanding's Turtle
(*Emydoidea blandingii*)

A Species Conservation Assessment
for
The Nebraska Natural Legacy Project



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The mission of the Nebraska Natural Legacy Project is to implement a blueprint for conserving Nebraska's flora, fauna and natural habitats through the proactive, voluntary conservation actions of partners, communities and individuals.

Purpose

The primary goal in development of at-risk species conservation assessments is to compile biological and ecological information that may assist conservation practitioners in making decisions regarding the conservation of species of interest. The Nebraska Natural Legacy Project recognizes the Blanding's turtle (*Emydoidea blandingii*) as a Tier I at-risk species. Some general management recommendations are made here regarding Blanding's turtles; however, conservation practitioners will need to use professional judgment to make specific management decisions based on objectives, location, and a multitude of variables. This resource was designed to share available knowledge of this at-risk turtle that will aid in the decision-making process or in identifying research needs to benefit the species. Species conservation assessments will need to be updated as relevant scientific information becomes available and/or conditions change. The Nebraska Natural Legacy Project focuses efforts in the state's Biologically Unique Landscapes, but it is recommended that whenever possible, practitioners make considerations for a species throughout its range in order to increase the outcome of successful conservation efforts.

Common Name	Blanding's Turtle	**Scientific Name**	*Emydoidea blandingii*
Order	Testudines	**Family**	Emydidae
G-Rank G4	**S-Rank** S4	**Goal** 4	**Distribution** Limited

Criteria for selection as Tier I Ranked as imperiled or vulnerable in all but one state in its range

Trends since 2005 in NE Stable

Range in NE Primarily Sandhills marshes, very locally in eastern portion of state

Habitat Requires proximity to water; Sandhills fens, Sandhills freshwater marsh, northern cordgrass wet prairie, small tributaries, Sandhills prairies (upland habitat), marshes and oxbows in eastern portion of state

Threats Habitat fragmentation and loss of wetlands in eastern part of range; vehicle mortality; collection for pet trade

Climate Change Vulnerability Index: Not Vulnerable; presumed stable

Research/Inventory Conduct surveys along eastern edge of range; population monitoring

Landscapes Cherry County Wetlands, Dismal River Headwaters, Elkhorn Confluence, Elkhorn River Headwaters, Lower Loup Rivers, Lower Platte River, Middle Niobrara, Upper Loup Rivers and Tributaries

Status

According to the last review in 2005, Blanding's turtle state Heritage status rank is S5, U.S. national status is N4, and global conservation rank is G4 (NatureServe 2009). Blanding's turtles have an imperiled or vulnerable status in almost all of their range. The Nebraska Natural Legacy Science Team set a goal of maintaining at least four populations in the state (Schneider et al. 2011).

Principal Threats

Approximately one-third of all aquatic and semi-aquatic turtle species in the United States are in need of some type of conservation action (Lovich 1995, Gibbs and Shriver 2002). Because of delayed sexual maturity in turtles, populations are less able to sustain significant disturbances and increased mortality threats (Wilbur and Morin 1988, Congdon et al 1993, Gibbs and Shriver 2002). Blanding's turtles are susceptible to loss (conversion) of wetland and upland habitat (MNDNR 2008). As landscapes are altered, predation on turtle nests could become a more significant threat in Nebraska. As much as 82% of nest mortality of an eastern turtle community that included *E. blandingii* was attributable to predation. Mammalian nest predators, including raccoons (*Procyon lotor*) and red (*Vulpes fulva*) and gray foxes (*Urocyon cinereoargenteus*), were most common (Congdon et al. 1983). The turtles also can be exposed to significant mortality risks as they move between seasonal habitat types (Beaudry et al. 2009). In particular, terrestrial, semi-terrestrial, and large-bodied pond turtles in the eastern and central United States face the highest risk of mortality from roads and traffic (Gibbs and Shriver 2002). Gibbs and Shriver found that land areas covered with more than 1 km of roads/km^2 and that support travel for 100 or more cars/day are most likely to negatively impact Blanding's turtles (2002). Grgurovic and Sievert analyzed that the probability of road-related turtle mortality can decrease when the mean traffic density is 550 vehicles or less per day (2005). Also, heavy use of all-terrain vehicles near turtle nests can be damaging (MassWildlife 2007). Other threats to turtles include collection for the pet trade and meat market that reduce wild populations (Salzberg 1995, Dixon 2000, Gibbons et al. 2000). Concern is growing that the harvest of turtles for commercial trade is not sustainable (Ceballos and Fitzgerald 2004).

Description

Blanding's turtles are 12.7 – 20.3 cm long. Females are larger than males. The turtles have a bright yellow chin and throat. The black carapace has a smooth helmet shape with yellow spots. The upper jaw has a center notch visible at the front of the mouth. The mostly yellow plastron is hinged, and it is slightly concave on males. The neck is long and head somewhat flattened with protruding eyes. Box turtles have similarly hinged plastrons but lack the bright yellow chin and throat (Fogell 2010, Panella 2010). See Figure 1.

FIGURE 1. The Blanding's Turtle has a distinctive bright yellow chin and throat.

Habitat and Range

Blanding's turtles are semi-aquatic. They prefer wetland habitats instead of lotic and upland sites (Edge et al. 2010). They inhabit lake shallows, ponds, marshes, and creeks with soft bottoms and dense aquatic vegetation. Marshes and small ponds appear to be particularly important to juvenile Blanding's turtles in offering waters less inhabited by large predators (Bury and Germano 2003). A mosaic of connected habitat may be necessary to support the shifting needs of Blanding's turtles by season. It appears that forested wetlands are preferred in spring, wetlands with morning sun and abundant egg masses for feeding in early summer, and deeper pools that stay cooler in late summer and fall (Hartwig and Kiviat 2007, Beaudry et al. 2009). Blanding's turtles are tolerant of cold temperatures in moist, terrestrial hibernacula (Dinkelacker et al. 2004) but extreme lows in dry winters could be problematic for turtles in the Sandhills (Costanzo et al. 2004). In Nebraska, Blanding's turtles have been found in Cherry County Wetlands, Dismal River Headwaters, Elkhorn Confluence, Elkhorn River Headwaters, Lower Loup Rivers, Lower Platte River, Middle Niobrara, Upper Loup Rivers and Tributaries.

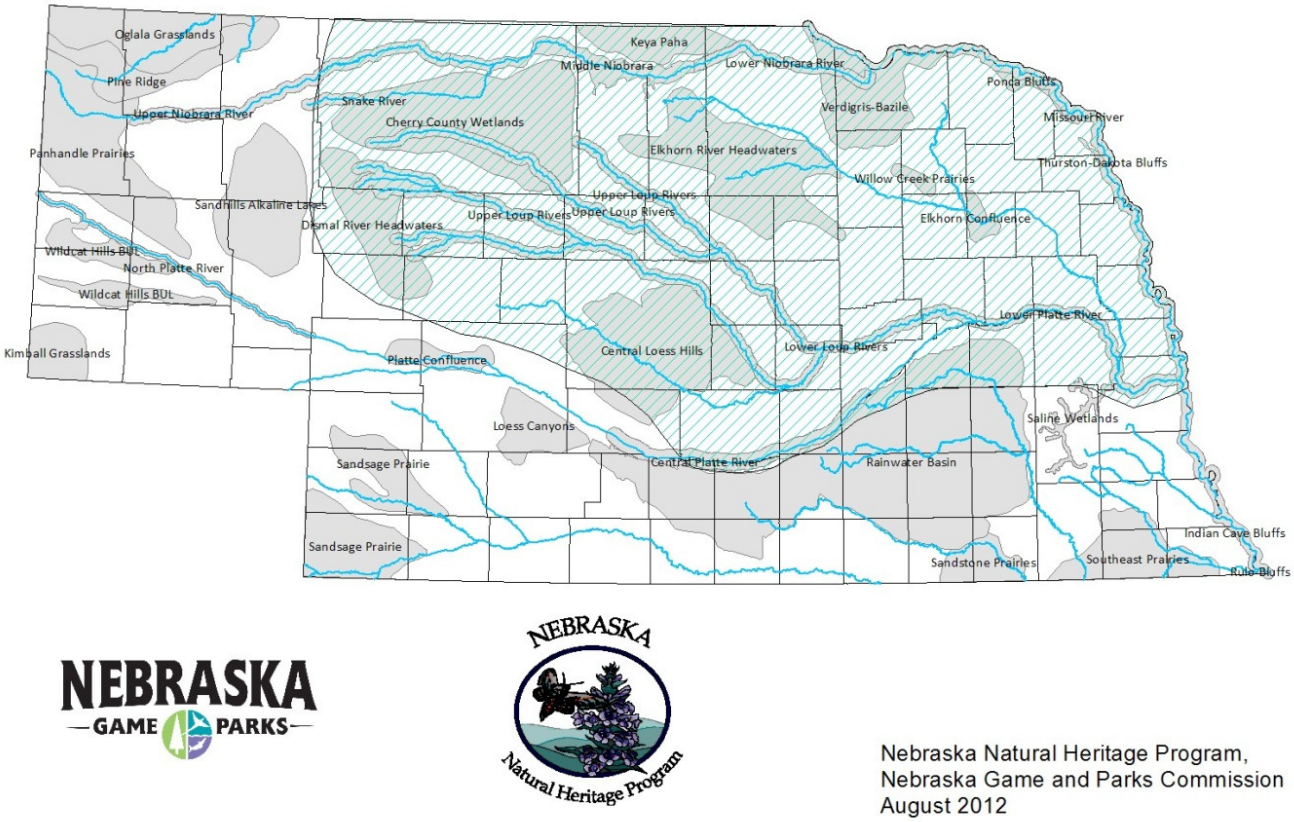

FIGURE 2. Current range of Blanding's turtles in Nebraska based on field observations, museum specimens, and expert knowledge. Map courtesy of Nebraska Natural Heritage Program, Nebraska Game and Parks Commission.

Area Requirements

Blanding's turtle dispersal varies seasonally, with long distances traversed in the spring as turtles move to ephemeral wetlands. Females, in particular, may also move long distances during the nesting season (Piepgras and Lang 2000). For both sexes, Grgurovic and Sievert found a mean annual home range size of 22 ha and a mean home range length (i.e., distance between two furthest sites used by an individual, Pluto and Bellis 1988) of 856 m in Massachusetts (2005). However, research suggests that the landscape complex needed for a Blanding's turtle during the course of its lifetime encompasses a much greater area than indicated here (Grgurovic and Sievert 2005). Piepgras and Lang indicated a home range size of 63 ha (2000), and Grgurovic and Sievert found a maximum home range length of 3.2 km traveled over 46 days (2005).

Diet

Blanding's turtles are omnivorous. They prefer to prey or scavenge on crayfish, frogs, fish, earthworms, and snails, but they also consume berries and other vegetation. They will feed from the land and from the water (Fogell 2010, Panella 2010).

Reproduction

Blanding's turtles mate in early spring and nest May to July. Nesting occurs almost exclusively during evening hours (Congdon et al. 1983). The female lays 8 - 12 oval, dull-white, leathery 3.8 cm eggs. Hatchlings appear August to September (Fogell 2010, Panella 2010). Sex of the hatchlings is determined by the incubation temperature; higher temperatures (i.e., >30° C; 86°F) result in production of females (Ewert and Nelson 1991). Males do not attain breeding age until approximately 12 years and females not until 18 years of age (MassWildlife 2007). A healthy individual may live 70 years (Panella 2010).

Research and Conservation Strategies

A multitude of factors should be considered before implementing any conservation actions for species. Within the guidelines of state and federal law, the Nebraska Natural Legacy Project recommends: 1) consider, but do not limit options to, scenarios that benefit both the species of interest and property owners, 2) consider species dispersal and landscape context, 3) plan for multiple years, and 4) do no harm.

In Nebraska, conservation considerations should be made for Blanding's turtles in eight Biologically Unique Landscapes: Cherry County Wetlands, Dismal River Headwaters, Elkhorn Confluence, Elkhorn River Headwaters, Lower Loup Rivers, Lower Platte River, Middle Niobrara, Upper Loup Rivers and Tributaries. These landscapes offer the best opportunities for conservation of the species within Nebraska based on current knowledge. Given the principal threats identified, conservation efforts for Blanding's turtles (summarized in Table 2) may want to employ the following management strategies:

1. Wetland conservation can provide habitat for Blanding's turtles. Blanding's turtles use wetlands of mean size 1.5 ha and shoreline length of approximately 600 meters (Attum et al. 2008). Blanding's turtles tend to occupy wetlands near forest and that are spaced at least 450 m from roads (Attum et al. 2008). Protect and restore wetland complexes with some forest cover, while ensuring connectivity and minimizing impacts from roads (Attum et al. 2008). A distance less than 50 m between patches connected by high-quality corridors is important to Blanding's turtles (Rickets 2001, Fleishman et al. 2002, Attum et al. 2008). A 250 m buffer zone may be appropriate for rare species (Attum et al. 2008). Natural or mitigated habitats should offer "abundant, emergent vegetation…basking areas, muck, floating plant material, and submerged aquatic vegetation" (Hartwig and Kiviat 2007).

2. Ensure turtle access to upland areas for nesting; nests further from water are less likely to be predated (Congdon et al. 1983). Consider exclosures for highly vulnerable populations (D. D. Fogell, pers. comm.). Because Blanding's turtles may use grassy upland sites for nesting, discourage conversion to agriculture in sites utilized heavily by the turtles. Limit mowing and chemical exposure impacts to juveniles.

3. Consider installment of seasonal signage alerting motorists to highly sensitive turtle areas to encourage drivers to travel slower, more cautiously in select locations. High risk areas may also be equipped with turtle passageways of various designs. During the nesting season, discourage ATV use where Blanding's turtles nest.

4. Prioritize reducing mortality of sexually mature individuals. Turtle species, in general, have long life-spans and low fecundity. The loss of adults is more detrimental to this strongly k-selected species than loss of eggs or juveniles (Congdon et al. 1993, Heppel 1998).

5. In Nebraska, it is illegal to take, possess, transport, export, process, sell or offer for sale, or ship [Blanding's turtle] (NGPC 2005). Regulations should be enforced.

6. Osentoski and others (2002) have isolated and characterized microsatellite loci from Blanding's turtles that may be useful in making decisions regarding the conservation of genetic diversity of the species.

7. Numerous USDA-NRCS Farm Bill programs might be used to benefit Blanding's turtles, but each management practice should be scientifically tested before it is widely implemented for this purpose. Consider:

    CRP – CP 2 (Native Grasses), 4D (Permanent Wildlife Habitat), 9 (Shallow Water Areas for Wildlife), 10 (Existing Grasses and Legumes), 21 (Filter Strips-grass), 22 (Riparian Buffers), 23 (Wetland Restoration-floodplain), 23A (Wetland Restoration- non-floodplain), 25 (Rare and Declining Habitat), 29 (Wildlife Habitat Buffer), 33 (Upland Bird Habitat Buffer), 38 (State Acres for Wildlife Enhancement), 42 (Pollinator Habitat)

    EQIP- 528 – Prescribed Grazing, 314 – Brush Management, 390 – Riparian Herbaceous Cover, 644 – Wetland Wildlife Habitat Management, 645 – Upland Wildlife Habitat Management, 657 – Wetland Restoration, 659 – Wetland Enhancement

    Wetland Reserve Program

    WHIP- Wildlife Habitat Improvement Program

    GRP-Grassland Reserve Program

    FRLPP-Farm and Ranch Land Protection Program

    WILD Nebraska

Availability of programs may vary in any given year.

Information Gaps

Breeding and overwintering locations, as well as travel corridors, for Blanding's turtles are not well known, particularly along the eastern edge of the species' range (Schneider et al 2011). Conduct surveys for Blanding's turtles and monitor populations. Radio transmitters may

be used to track individuals. Refer to Grgurovic and Sievert (2005) for an overview of previously used methods for safe capture and marking. Our knowledge of *E. blandingii* intrapopulation and interpopulation genetic diversity is also lacking (D. D. Fogell, pers. comm.).

Considerations for Additional Species

At-risk species that share habitat with Blanding's turtles should be considered in management plans for the turtle. Conservation of Blanding's turtles may affect or be influenced by at-risk species that can be found in the same Biologically Unique Landscapes as the turtles. Table 1 lists a sample of at-risk species you may want to consider while planning for Blanding's turtle habitat. This list will not apply to all *E. blandingii* sites of occupancy nor is the list all-inclusive.

TABLE 1. Tier 1 at-risk species identified in the Nebraska Natural Legacy Project that inhabit biologically unique landscapes with Blanding's turtles (Schneider et al. 2011) may necessitate consideration in habitat management plans.

Animals

Northern River Otter (*Lontra canadensis*)
Plains Harvest Mouse (*Reithrodontomys montanus griseus*)
Plains Pocket Mouse (*Perognathus flavescens perniger*)
Bell's Vireo (*Vireo bellii*)
Greater Prairie-Chicken (*Tympanuchus cupido*)
Henslow's Sparrow (*Ammodramus henslowii*)
Interior Least Tern (*Sternula antillarum athalassos*)
Loggerhead Shrike (*Lanius ludovicianus*)
Long-billed Curlew (*Numenius americanus*)
Piping Plover (*Charadrius melodus*)
Short-eared Owl (*Asio flammeus*)
Whooping Crane (Grus americana)
American Burying Beetle (*Nicrophorus americanus*)
Blacknose Shiner (*Notropis heterolepis*)
Finescale Dace (*Chrosomus neogaeus*)
Northern Redbelly Dace (*Chrosomus eos*)
Plains Topminnow (*Fundulus sciadicus*)
Topeka Shiner (*Notropis topeka*)
Iowa Skipper (Atrytone arogos iowa)
Ottoe Skipper (*Hesperia ottoe*)
Mottled Duskywing (*Erynnis martialis*)
Married Underwing (*Catocala nuptialis*)
Whitney Underwing (*Catocala whitneyi*)
Platte River Caddisfly (*Ironoquia plattensis*)
Regal Fritillary (*Speyeria idalia*)
Pimpleback (*Quadrula pustulosa*)
Plain Pocketbook (*Lampsilis cardium*)

Plants

Hall's Bulrush (*Schoenoplectus hallii*)
Small White Lady's-slipper (*Cypripedium candidum*)
Western Prairie Fringed Orchid (*Platanthera praeclara*)
Wolf Spikerush (*Eleocharis wolfii*)

TABLE 2. Suggested management for Blanding's turtles in Nebraska is summarized. The following should be interpreted as general guidelines based on the best available knowledge at the time of this publication. See Research and Conservation section of this document for more detail and Reference section for sources of additional information.

FOCUS	STRATEGIES	MITIGATION and CONSIDERATIONS
Inventory of Blanding's turtles	Document locations used by Blanding's turtles in Nebraska	Radio transmitters may be used
Keep high ratio of sexually-mature adults in the population	While I do not recommend completely neglecting nest and juvenile survivorship, efforts are better invested in reducing adult mortality and maintaining habitat	Turtles have long life-spans, late sexual maturity, and low fecundity
Wetland Conservation	Preserve wetlands used by Blanding's turtles, and create wetlands in an interconnected complex. Protect wetlands from chemical run-off by maintaining at least a 50' buffer in naturally vegetated state.	Mitigation wetlands of at least 1.5 ha should be designed to provide adequate vegetation and forest cover
Maintain upland habitat	Discourage further loss of nesting sites and conversion of open, grassy/brushy uplands to agriculture through various programs. Protect Blanding's upland sites of occupancy from chemical exposure and mowing when eggs and hatchlings are present.	Blanding's turtles have nested in farm fields to evade nest predation. These nests could be marked for avoidance and protected from predators by exclosures. Screens must be removed just before hatching (approximately August 1).
Halt increases in turtle mortalities on roads	Place constructed wetlands at least 450 m from road. Construct turtle passages in high risk locations (e.g., funnels). Install signage to alert motorists to periods of increased turtle movement (e.g., May to October).	Roads with traffic of more than 100 vehicles/day are most likely to impact Blanding's turtles
Document and maintain genetic diversity in populations	Facilitate movement of turtles between populations by maintaining adequate habitat corridors. Consider translocations of individuals into appropriate habitats.	Review of genetic research on Blanding's turtles may influence decisions

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