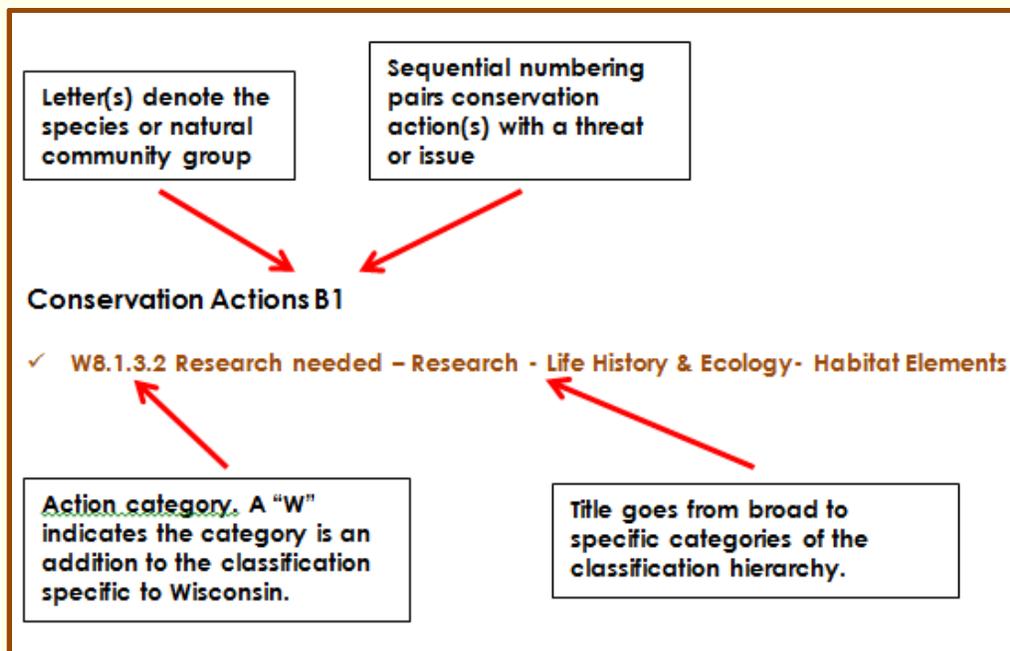


Threats/Issues and Conservation Actions for Reptile and Amphibian Species of Greatest Conservation Need

This is a summary of threats or issues affecting the conservation of herptile SGCN and actions that can be implemented at the source, or to address the effects of the source on the species or its habitat. Distinguishing the source of the impact from the effects or the changes that occur to the species and its habitat is important because the two typically need a different approach and set of conservation actions. For example, if livestock encroach upon streams and adjacent wetlands and floodplains in northern cricket frog habitat they can trample frogs, or compact the soil and eliminate the small spaces they inhabit along streams and in wetlands. Conservation actions for this species may include installation of fencing to keep animals out of areas occupied by the cricket frog or they may seek to restore the microhabitat features they inhabit. Multiple sources of impact may have the same or similar effects on species or habitat. Similar effects may be addressed collectively by a single action or suite of actions.

Conservation actions applicable to all or most amphibian and reptile SGCN are organized according to categories in the [Conservation Actions Classification](#) based on the Open Standards threats and actions classification¹. If the threat/issue and its associated conservation action(s) apply to one or a few species they are identified as such. Conservation actions overlapping in content or scope may be grouped under a single code. Coding and identification for each action category are explained further below.



¹ See the following website for the classifications. <http://cmp-openstandards.org/tools/threats-and-actions-taxonomies/> (Search Terms: open standards conservation threats actions). The conservation actions classification is provided in Appendix 2.1.



More about how threats and issues or conservation actions were developed, opportunities to provide input on this topic, and how this information can be used to make conservation decisions can be found on the [Conservation Actions and Effectiveness Monitoring](#) page or in [Sections 2 and 3.4](#) of the Wisconsin Wildlife Action Plan.

Threat/Issue H1

Agricultural practices for both crops and animals can result in conversion of suitable nesting habitat (e.g., sand prairie), physical disturbance to breeding and overwintering sites, and degradation and fragmentation of riparian, shoreline and instream habitat. Livestock compact soils and overgrazing in and around wetlands, lakes, ponds, and streams destroys grasses and other vegetation that provide shelter and foraging areas for herptiles.

In addition to the agriculture footprint, agricultural effluents that move offsite and contain sediments, nutrients and chemicals, can change or decrease water quality if they reach the wetlands and aquatic habitats where herptile SGCN live. Moderate to intensive grazing can cause shoreline disturbance and impact turbidity of water, which can lead to negative impacts on frogs, eggs, and tadpoles. Runoff of pesticides and herbicides, like atrazine, may threaten frogs directly by killing eggs, larvae, or adults. Indirect effects of pesticides may include alterations in behavior (frogs are less able to escape predators) and changes in the food base (invertebrates are killed by pesticides). Contaminants may also alter sex ratios of amphibians, resulting in reduced reproductive success. This is particularly important for amphibian SGCNs and in those parts of the state where intensive agriculture occurs in close proximity to wetland and warmwater aquatic communities.

Biological resource use is also a frequently cited as an issue for herptile SGCN. One of the subcategories identified in this category is wood harvest and related practices. Wood harvest within riparian habitats that results in a loss of large and fine woody debris (loss of structural complexity) in forests results in lack of habitat for the woodland salamander species, turtles and snakes.

Conservation Actions H1

✓W2.3 Land/water management - Habitat and natural resource restoration – (aquatic, wetland and terrestrial)

Seek to replace and improve the habitat elements that have been degraded or lost as a result of past forest management practices as well as agricultural development and pollution from agricultural effluents. This action category presumes that multiple objectives or uses exist on the landscape. That is, connected upland, aquatic and wetland habitats for herptile SGCNs persist in an agricultural matrix. Conservation projects or practices can be targeted at a specific aspect(s) or process that is important for herptile SGCN habitat such as restoring riparian vegetation, leaving adequate distances between disturbance and wetland or aquatic habitats, or upland

nesting sites and preserving sufficient amounts of woody debris around ephemeral ponds and streams in managed forests to sustain salamanders, turtles or frogs.

✓5.3 Law and policy - Private sector standards and codes

Best Management Practices (BMPs) for the forestry and agricultural sectors establish important elements for conserving and protecting habitat for SGCN herptiles. Individuals and organizations that apply these standards and practices can consider how closely their production and resource use objectives can be aligned with conservation objectives for herptile SGCNs.

✓W2.4 Land/water management - Comprehensive management

Comprehensive management considers the full suite of protection, preservation and restoration activities to sustain and improve habitat for herptile SGCN. This is most applicable to public lands and conservation lands that are established to prevent habitat loss and fragmentation. In these areas it is important to preserve and manage connections between wetlands and uplands to facilitate movement of herptile SGCNs between these habitats (e.g. turtles seeking nesting sites, snakes moving from basking areas to den sites). Herptiles use a wide variety of habitats from sand prairies to streams to ephemeral ponds; restoration, management and protection of these diverse habitats are the primary actions proposed for conserving herptile Species of Greatest Conservation Need in Wisconsin. A wide variety of efforts will be needed to restore, conserve and protect these habitats, from management of prairies to reduce impacts of natural succession, to reducing densities of invasive plants, such as reed canary grass in wetland areas.

Threat/Issue H2

Harvest of snakes, frogs, and turtles for research, education, pet trade, and for personal use continues to be an issue for some herptile species, especially turtles.

Conservation Actions H2

✓5.1.2 Law and policy - Legislation – National (Federal) level

✓5.1.3 Law and policy - Legislation - Sub-national (State) level

State and federal legislation and regulation establish prevention, controls and limits for the collection and harvest of herptile SGCN. Since many of these species are already listed as threatened or endangered, state endangered species laws prohibit their collection.

✓5.4.2 Compliance and enforcement – National (Federal) level

✓5.4.3 Compliance and enforcement – Sub-national (State) level

More widespread compliance and enforcement of trade restrictions is needed.



Threat/Issue H3

Disease and invasive species are also a concern for herptiles. This includes viral, bacterial, and fungal diseases and parasitism. Invasive species can negatively impact herptiles in a variety of ways. For example, invading reed canary grass and giant reed grass may simplify habitats in many ways, including lowering wetland and shoreline habitat quality by eliminating the soil and surface conditions that allow crayfish to burrow. Additionally, rusty crayfish, also an invasive, directly competes with native crayfish that create burrows. Burrows created by native crayfish provide the primary overwintering shelter for the Eastern massasauga rattlesnake. Seasonal use by Eastern massasauga rattlesnakes of reed canary-dominated areas is also much lower than that of areas with native wetland vegetation. Alterations of aquatic habitats may favor increasing pathogen (trematodes) vectors such as snails, resulting in an increased incidence of malformations, potentially affecting recruitment rates.

Conservation Actions H3

- ✓W5.2.1 Law and policy - Policies and regulations – National (Federal),
- ✓W4.3.1 Education and awareness - Awareness and communications – General ecology, biology, habitat related to conservation needs
- ✓W7.2.3 External capacity building - Alliance and partnership development – Inventory and monitoring

Health concerns for herptiles can be addressed through a combination of state and local policies, education and partnerships between state resource agencies and local conservation groups. This effort entails developing appropriate response strategies to unusual and or acute mortality outbreaks, collaborative partnerships with groups and individuals with knowledge of reptile and amphibian disease and biology, and a system utilizing community participation to alert the appropriate agencies of unusual and or acute mortality outbreaks.

Threat/Issue H4

The net impacts of climate change and extreme weather events, including expected warmer and drier conditions in our state, are likely to negatively impact many herptile SGCNs. Poor water quality (e.g., low dissolved oxygen) may be a limiting factor for cricket frogs, which seem to be especially sensitive to this. Competition among native species (green frogs, bullfrogs v. mink frogs) may occur if green and bullfrogs advance further into mink frog range with average increases in water and air temperature. Mink frog embryos have limited tolerance to warmer water temperatures and consequent lower oxygen diffusion rates. Cold winters with little snowpack result in mortality of overwintering turtles and frogs. Limited mobility of most herptile species make it difficult for them to move to more favorable areas at a pace that keeps up with changes in climate. Moreover, while trends in environmental conditions can be measured and modeled, the spatial and temporal variability of changes in climate and weather are

more difficult to project, making it difficult to determine where to target adaptation measures.

Conservation Actions H4

✓W1.2 Land/water protection – Resource and habitat protection

✓W2.3.1 Land/water management - Habitat and natural resource restoration (aquatic, wetland and terrestrial)

✓W2.4 Land/water management – Comprehensive management

Comprehensive management and habitat restoration projects that incorporate or expand objectives to include adaptation to climate change remain the best strategy for addressing this issue. Adaptation strategies for herptile SGCNs include providing linkages between habitats and retaining riparian vegetation to help maintain water temperature and quality.

Threat/Issue H5

Residential and commercial development is a significant issue for SGCN herptiles because it results in loss of breeding and foraging habitat or changes to the composition of habitat. The residential development of shorelines is a significant issue for lake dwelling species because it degrades or eliminates habitat.

Conservation Actions H5

✓W4.2.1 Education and awareness – Training – Management and conservation training

Conservation actions to address this issue are focused on two primary areas. The first of these is raising awareness and education of landowners to preserve and restore riparian and floodplain habitat. Landowner and community associations are core groups that can successfully implement actions in this category.

✓W5.2.3 Law and policy – Policies and regulations - Local

The second category is policies and regulations that maintain, encourage and support protection of these natural communities. Local policy and regulations are relatively more effective in this respect because they can more readily target aquatic systems that provide SGCN habitat. This conservation action category is also important for fish and aquatic invertebrate SGCNs.

Threat/Issue H6

Lack of information for herptile SGCN in the following areas are among the most important for conservation in the next five to ten years.



- Statewide distribution of herptile SGCN. Information is concentrated in publically protected or preserved lands. More inventory work is needed on private lands through citizen-based monitoring or other surveys, depending on the target species.
- Reptiles have little or no long-term monitoring taking place. It is crucial for status assessments and identifying viable populations, which leads us to identify conservation actions and opportunity areas.
- For some of our most endangered species, there is a need to conduct focused research to answer question that will inform management and decision-making. For example, we need to determine the long term viability of extant populations of ornate box turtles via quantitative surveys, modeling, mark- recapture studies, and other appropriate scientific methods.
- New and emerging diseases will continue to jeopardize herptile SGCN. Monitoring efforts are needed to help identify new disease cases, to track the spread of existing cases.
- Research to identify causes, mechanisms of transport, etc. is needed for new and emerging disease. Disease is a threat to amphibians and reptiles. For example, snake fungal disease has affected a number of Wisconsin snake species and research is ongoing to learn more about the extent and spread of this disease.

Conservation Actions H6

✓W8.1.2.1 Research needed – Research – Population size, distribution and past trends – Distribution and mapping

✓8.1.5 Research needed – Research threats

✓8.3.1 – Research needed – Monitoring – Population trends

A combination of inventory and monitoring is needed as well as research on transmission and ecology of herptile diseases. Creation and support of herptile citizen-based monitoring projects is important to assist filling information gaps.

✓W4.2.2 Education and monitoring – Training – Inventory and monitoring training

Creation and support of herptile citizen-based monitoring projects is important to assist filling information gaps.

Threat/Issue H7, TURTLES

Lack of information about locations of SGCN turtle nesting sites (especially for large river species in the Western Coulees and Ridges and Lake Superior Ecological Landscape) hinders our ability to manage and protect nesting sites.

Conservation Actions H7, TURTLES

✓W4.2.2 Education and awareness – Training – Inventory and monitoring training

In landscapes containing natural communities with moderate or high association for herptile SGCNs, engage the public in citizen-based monitoring of turtles;

✓W4.3.1 Education and awareness - Awareness and communications – General ecology, biology, habitat related to conservation needs

Increase awareness of landowners to identify and report turtle nesting sites.

Threat/Issue H8, TERRESTRIAL AND WETLAND HERPS

Poorly timed mowing practices along roads that intersect herptile habitat affects turtle, lizard and snake SGCNs associated with transportation corridors. Road mortality is also a significant issue for many turtle species and snakes.

Conservation Action H8, TERRESTRIAL AND WETLAND HERPS**✓W4.3.2 Education and awareness – Awareness and communications – Harvest, roadkill or other sources of illegal, incidental mortality, nonlethal threats**

The Wisconsin Turtle Conservation Program aims to identify areas with high road mortality for turtles in the state and implement measures to publicly mark these areas and increase citizen awareness. Also, continued interaction with state and local field transportation crews is essential.

Threat/Issue H9, FOUR-TOED SALAMANDER

Some species, like the four-toed salamander, required targeted monitoring efforts as they are unlikely to be found using techniques used for other species.

Conservation Action H9, FOUR-TOED SALAMANDER**✓W8.1.2.1 Research needed – Research – Population size, distribution and past trends – Distribution and mapping**

Targeted searches for four-toed salamanders and eggs in sphagnum-covered logs overhanging ephemeral ponds.

Threat/Issue H10, EASTERN AND WESTERN RIBBONSNAKE AND LINED SNAKE

The distribution and abundance of some Wisconsin herptiles. In some cases, it is because the species is known (or believed) to be exceedingly rare (e.g. eastern and western ribbonsnakes; lined snake).

Conservation Action H10, EASTERN AND WESTERN RIBBONSNAKE AND LINED SNAKE



✓W8.1.2.1 **Research needed – Research – Population size, distribution and past trends – Distribution and mapping**

Surveys to document the range and status and to map the locations of these species using species specific protocols.