

# Butler's Gartersnake (*Thamnophis butleri*) Species Guidance

Family: Colubridae

**State Status:** [Special Concern](#) (de-listed from Threatened, 2014)

**State Rank:** [S4](#)

**Federal Status:** [none](#)

**Global Rank:** [G4](#)

**Wildlife Action Plan Mean Risk Score:** [3.9](#)

**Wildlife Action Plan Area Importance Score:** [4](#)



Counties with documented locations of Butler's gartersnakes in Wisconsin. Source: Natural Heritage Inventory Database, September 2012.



Photo by Josh Kapfer

## Species Information

**General Description:** The Butler's gartersnake is the smallest of the five Wisconsin gartersnake species. Adults are typically 38-51 cm (15-20 in) long. The snake's longitudinal stripe pattern, a single dorsal stripe and two lateral stripes, is common in the genus *Thamnophis*. Stripe color varies from light yellow to a rich orange-yellow, against a background color of black, brown, or olive dorsal scales with yellowish-gray ventral scales. The lateral stripe on the Butler's gartersnake typically involves the upper part of scale row 2, all of scale row 3, and often part of scale row 4 ([Wisconsin gartersnake identification poster](#)).

**Similar Species:** The Butler's gartersnake looks similar to the plains gartersnake (*Thamnophis radix*) and hybridizes with it (Burghardt et al. 2006, Fitzpatrick et al. 2008a, Fitzpatrick et al. 2008b, Sloss 2011, Placyk et al. 2012). The lateral stripe on the plains gartersnake is typically narrow and pale yellow, and only involves scale row 3 and part or all of scale row 4. The Butler's gartersnake also looks somewhat similar to the common gartersnake (*T. sirtalis*) and hybridizes with it to some degree as well (Kapfer et al. in press). The lateral stripe on the common gartersnake may involve the upper half of scale row 1, always involves rows 2 and 3, and is of varying widths and shades of yellow. The western ribbonsnake (*Thamnophis proximus*) and eastern ribbonsnake (*Thamnophis sauritus*) are also Wisconsin gartersnakes that may be confused with the Butler's gartersnake. The ribbonsnakes, however, are noticeably more slender and lack any patterning on their supralabial (upper lip) and infralabial (lower lip) scales. Ribbonsnakes have lateral stripes on scale rows 3 and 4, and they also display a small white vertical stripe in front of their eye (Harding 1997). Lined snakes (*Tropidoclonion lineatum*), which have recently been documented in the state (Raimond and Lorch 2012), possess a single anal plate and a double row of "half-moon" checkering running lengthwise along the body on the ventral scales.

**Associated Species:** The prairie crayfish (*Procambarus gracilis*, state status: special concern), white river crayfish (*Procambarus acutus acutus*, state status: none), and devil crayfish (*Cambarus diogenes*, state status: none) are important associated species. These crayfish create burrows that Butler's gartersnakes use as both overwintering sites and active-season refugia. Snake species that often co-occur in the same habitat with the Butler's gartersnake are the common gartersnake, Dekay's brownsnake (*Storeria dekayi*) and red-bellied snake (*Storeria occipitomaculata*).

**State Distribution and Abundance:** The Butler's gartersnake range in Wisconsin, established using both morphological data and genetic research to exclude hybrid records, includes portions of Dodge, Fond du Lac, Jefferson, Milwaukee, Ozaukee, Sheboygan, Washington, and Waukesha counties (Sloss 2011, Kapfer et al. 2013, Sloss unpublished data).

**Global Distribution and Abundance:** The Wisconsin Butler's gartersnake population is geographically disjunct from other Butler's gartersnake populations in the United States and Canada (Conant and Collins 1998). The Butler's gartersnake is also found in northeastern Indiana (Endangered), northwestern Ohio (apparently secure), southeastern Michigan (apparently secure) and southern Ontario (Threatened).

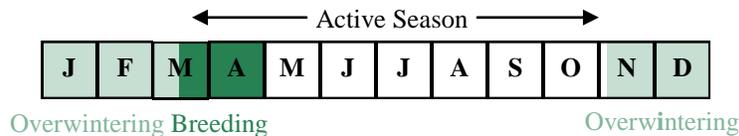


Global range map for the Butler's gartersnake. (NatureServe 2013)

**Diet:** A specialized diet distinguishes Butler’s gartersnake from other gartersnake species. Most gartersnakes are generalists that prey on a wide variety of small-bodied vertebrates (i.e., lizards, amphibians, birds, rodents) and invertebrates (i.e., leeches and earthworms), but the Butler’s gartersnake specializes almost exclusively on earthworms (83% of their diet, Carpenter 1952). Curiously, earthworms are not native to Wisconsin, and questions persist regard the Butler’s gartersnake diet prior to earthworms’ introduction from Europe.

**Reproductive Cycle:** Mating usually occurs in March and April after snakes emerge from overwintering (Vogt 1981). Butler’s gartersnakes are ovoviviparous (eggs retained in female until they hatch) and females produce 4-20 young between early July and mid-September (Vogt 1981, Ernst and Ernst 2003). Offspring typically reach sexual maturity during their second full year. Females in some populations congregate during the incubation of their developing young. This communal behavior may reflect limited availability of specific, yet-to-be-identified, microhabitat conditions.

**Ecology:** Butler’s gartersnakes become active shortly after frost-out in March or early April, and activity is often triggered by a spring rain. They remain active near their overwintering site until warmer temperatures trigger dispersal to adjacent uplands, but some may remain in the wetlands throughout the season. Individuals range over a very small area (~2743 m<sup>2</sup> [3000 yds<sup>2</sup>], Carpenter 1952). Butler’s gartersnakes are usually active during the day. They tend to bask early in the day to elevate their body temperatures and often spend the remainder of the day under cover foraging or resting. The Butler’s gartersnake typically has a maximum active period of March 15 – November 5 in Wisconsin, and most likely returns to the same overwintering site each year.



Hileman (2010) reported densities of adult snakes field-identified as Butler’s gartersnakes at three Wisconsin sites that ranged from 53-376 individuals/ha. Juvenile density ranged from 150-600 individuals/ha.

**Natural Community Associations** (WDNR 2005, WDNR 2009):

*Significant:* [calcareous fen \(southern\)](#), [dry-mesic prairie](#), [emergent aquatic \(emergent marsh\)](#), [mesic prairie](#), [northern sedge meadow](#), [shrub carr](#), [southern sedge meadow](#), [wet prairie](#), [wet-mesic prairie](#)

*Moderate:* floodplain forest

*Minimal:* none

**Habitat:** Suitable Butler’s gartersnake habitat consists of open or semi-open canopy wetland and adjacent open or semi-open canopy upland habitat, including wet-mesic prairies, sedge meadows, shrub carr habitat, fresh (wet) meadows, low prairies, marshes, grasslands, savannas, old fields and vacant weedy lots (Vogt 1981, Ernst and Ernst 2003).

Wetland habitat may be any type of wetland except permanent open water. Lakes, streams, and deep ponds are not suitable, and nor are permanent stormwater management ponds. The shorelines of these habitats, however, can be suitable if intact ground vegetation is maintained at a height above eight inches. A 30.5-m (100-ft) wide section of a forested wetland is also suitable where it borders or is adjacent to suitable upland or wetland habitat.

Upland habitat must be within 91.5 m (300 ft) of suitable wetlands AND have intact ground vegetation (i.e., grasses, forbs) AND have less than 75% canopy cover. The upland habitat must be directly connected to the wetland in at least one location. Closed-canopy forests where ground vegetation is very sparse are not considered suitable, but old fields with significant invasion of woody shrubs and trees are suitable if grasses and forbs are still largely intact.

Additional habitat features to consider:

- Lawns or fields in active agriculture (e.g., row crops) are not suitable habitat.
- Fields that remain fallow for more than one year may be suitable habitat.
- Pastures are suitable habitat if more than 50% of the acreage maintains an eight-inch or greater canopy height.
- Paved roads (wider than private driveways) are considered impassible barriers to this species.

Overwintering habitat must provide access to underground refugia where snakes will not freeze or desiccate (dry out). Structures that typically provide these characteristics include animal burrows (typically created by crayfish or rodents), rotted-out root channels, and ant mounds. Anthropogenic structures such as improperly capped landfills and dumps, fills areas, old foundations and sink holes may also provide appropriate overwintering habitat. Overwintering areas for Butler’s gartersnakes are currently defined as wetlands.



Examples of Butler's gartersnake habitats in Wisconsin. Rori Paloski, Wisconsin DNR.

**Threats:** Loss and fragmentation of suitable wetland and upland habitat is the primary threat to the Butler's gartersnake and arises from development, agriculture, road construction, and natural succession. Development, agriculture, and roads may also impact this species by altering hydrology.

**Climate Change Impacts:** The effects of climate change are unclear for the Butler's gartersnake. Anticipated changes in storm frequency and intensity (WICCI 2011), peak water levels, and other waterway characteristics may alter currently suitable habitat for this species. Changes in the climate that affect crayfish populations may reduce suitable over-wintering habitat and depress densities in populations that are already isolated.

**Survey Guidelines:** The preferred survey method for the Butler's gartersnake is cover board surveys. Cover boards (3/4 in x 32 in x 48 in plywood – not OSB) should be placed in April before grass green-up in upland open canopy habitats within 30.5 m (100 ft) of suitable wetlands (see "Habitat" section) where dense short grass grows. Begin checking cover boards in early-May and check a total of 12-15 times on non-consecutive days before mid-July. Boards are most productive when checked no more than three hours before sunset on warm (> 65° F) sunny days. Live trapping for the Butler's gartersnake should only be attempted by individuals experienced in trapping and handling small mammals. Please also note that a Scientific Collector's Permit or Research License may be required for this work: <<http://dnr.wi.gov>, keyword "scientific collectors permit">.

Summarize results, including survey dates, times, weather conditions, number of detections, detection locations, and behavioral data and submit via the WDNR online report: <<http://dnr.wi.gov>, keyword "rare animal field report form">.

## Management Guidelines

*The following guidelines describe actions that will help maintain or enhance habitat for the species. These actions are not mandatory unless required by a permit, authorization or approval.*

This section provides guidance for maintaining, restoring and enhancing habitat for the Butler's gartersnake. The habitat management goal for this species is long-term preservation of open-canopy uplands connected, preferably broadly, to open-canopy wetlands.

**Upland Habitat:** A light but consistent (e.g., once per year) management protocol, and curtailment of incompatible human activities can keep upland habitat in a high-quality state for the Butler's gartersnake. Activities that temporarily or permanently destroy habitat, or that affect the connectedness and the structural complexity of upland habitat, can have detrimental effects on the Butler's gartersnake. The long-term upland habitat management goal is to maintain open-canopy (sun exposed) habitat, thereby preserving dense ground-layer vegetation (grasses and non-woody broad leaf plants). This goal is accomplished by mowing, burning, grazing, cutting, and/or herbiciding to prevent the encroachment of woody vegetation (brush and trees) before thinning of the ground layer vegetation occurs due to shading.

Upland habitat restoration or enhancement for the Butler's gartersnake should use a native prairie seed mix that meets the Butler's gartersnake upland habitat needs. Butler's gartersnakes are influenced by vegetation structure more than by species composition, so a simple, native short grass prairie mix is appropriate for restoring Butler's gartersnake habitat. Although native (rather than non-native) vegetation species are not a requirement for this species, native vegetation is still strongly recommended for ecological reasons. It is also important to note that other native animal species would benefit from a more diverse and intensive prairie restoration.

### Sample Upland Seed Mix

Common name	Scientific name	Ounces/acre
<b>Grasses</b>		
Nodding Fescue	<i>Festuca subverticillata</i>	2.0
Prairie Dropseed	<i>Sporobolus heterolepis</i>	16.0
Sideoats Grama	<i>Bouteloua curtipendula</i>	16.0
Little Bluestem	<i>Schizachyrium scoparium</i>	16.0
<b>Sedges</b>		
Bebb's Sedge	<i>Carex bebbii</i>	2.0
Prairie Sedge	<i>Carex prairea</i>	1.0
Brown Fox Sedge	<i>Carex vulpinoidea</i>	2.0
<b>Initial Cover Crop</b>		
Canada Wild Rye (annual)	<i>Elymus Canadensis</i>	16.0
<b>Forbs</b>		
Smooth Blue Aster	<i>Aster laevis</i>	1.5
Sky Blue Aster	<i>Aster oolentangiensis</i>	1.2
Prairie Blazing Star	<i>Liatris pycnostachya</i>	4.0
Wild Burgamot	<i>Monarda fistulosa</i>	1.0
Black-eyed Susan	<i>Rudbeckia hirta</i>	1.0
Stiff Goldenrod	<i>Solidago rigida</i>	1.0
Rattlesnake Master	<i>Eryngium yuccifolium</i>	2.0

Plastic netting without independent movement of strands can easily entrap snakes and other wildlife moving through the area, and cause dehydration, desiccation, and eventually mortality (Kapfer and Paloski 2011). If erosion matting (also known as an erosion control blanket, erosion mat or erosion mesh netting) is used, use the following matting (or something similar): North American Green S75BN, S150BN, SC150BN or C125BN. Netting that contains biodegradable thread with the “leno” or “gauze” weave (contains strands that are able to move independently) has the least impact on wildlife.

Wetland Habitat: Maintaining wetland habitat for the Butler’s gartersnake can be accomplished with a light but consistent (e.g., once per year) management protocol, with the goal of maintaining an open-canopy wetland. Maintaining wetland habitat may involve thinning and/or removing woody vegetation. Wetland maintenance may also involve reducing dense cattail (*Typha* sp.) beds and/or stands of exotic species (i.e., reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), giant reed grass (*Phragmites* sp.)) so that they account for 50% or (preferably) less of the wetland (Kapfer et al. 2013). Sustaining viable crayfish populations will likely help to increase carrying capacity of populations by providing more cover and over-wintering availability. Creating and managing corridors, underpasses, and culverts between suitable habitats will likely help to offset effects of habitat fragmentation and provide connectivity between populations.

Management for recovering, maintaining or improving grassland, prairie or savanna ecosystems: Managing grassland, prairie, or savanna ecosystems may include habitat for Butler’s gartersnakes. Although management activities may prove beneficial to the species it is recommended to adhere to the following guidelines to reduce take.

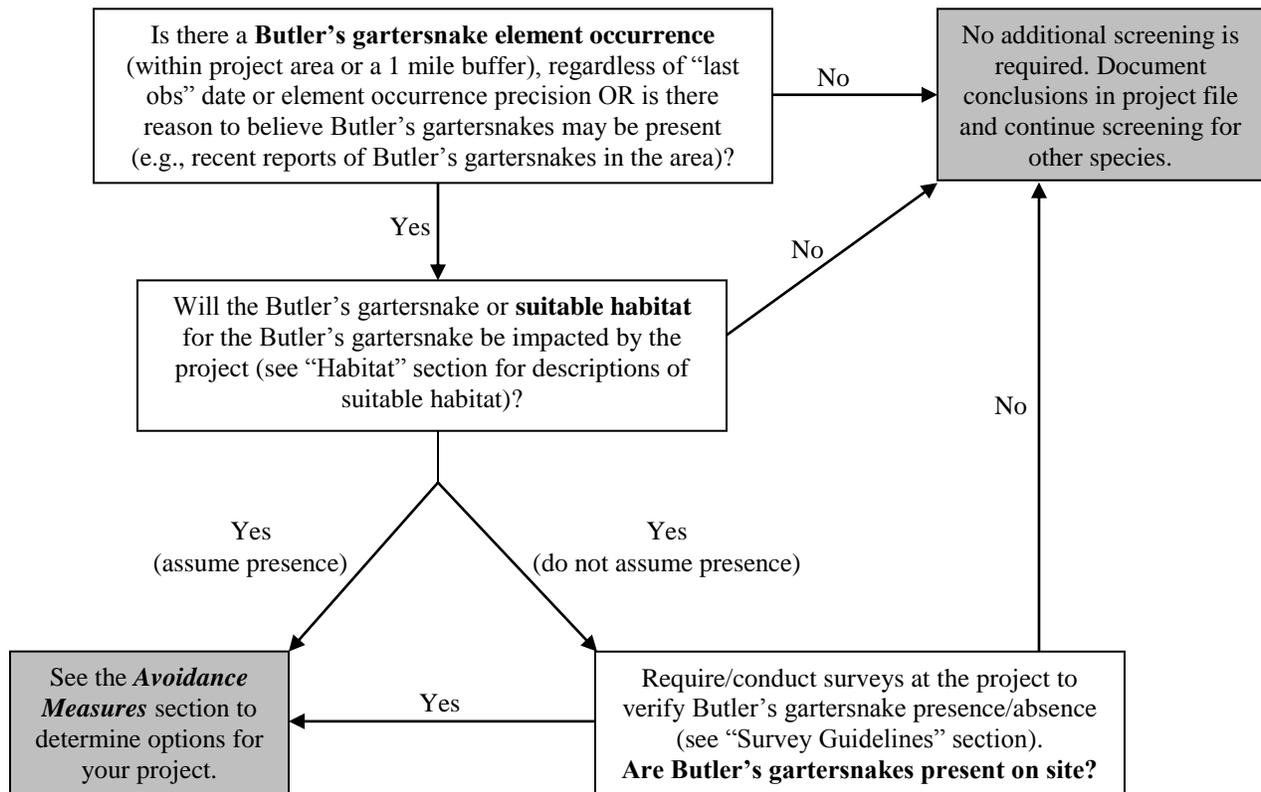
- A. Burning
  1. Burn between November 1 – March 15;
  2. If burning between March 16 – October 31, then burn only up to 25% of the available grassland habitat per year for that site.
- B. Mowing / Haying
  1. Conduct mowing in small patches in a monthly rotational pattern, with no more than 33% of the available grassland habitat per year on the site.
  2. Set mower blades a minimum of 20 cm (8 in) off the ground
  3. Work when weather conditions are most likely to avoid snake activity:
    - a. During the hottest period of the day when sunny conditions prevail and air temperatures exceed 80° F, or;
    - b. On very cool, overcast days when temperatures are below 50° F.

- C. Selective Brush / Tree-Cutting
  - 1. Utilize selective cutting (i.e., chain saw)
- D. Grazing
  - 1. Use light-to-moderate grazing (<1.0 head per acre) in rotations among habitat patches, with no more than 33% of the available habitat per year on the site.
    - a. Discontinue grazing in a patch when 50% of the grasses and forbs in a grazed patch are cropped to 20 cm (8 in) in height.
- E. Herbiciding
  - 1. Conduct herbiciding during the snake’s dormant period (November 1 – March 15)
  - 2. When herbiciding during the active season, spot treat with a low persistence/short half-life herbicide (i.e., Round-up®), using wick, sponge, or hand-held spray applications; not broadcast spraying.
  - 3. When treating woody vegetation use basal-bark or cut-stump-treatment method

## Screening Procedures

*The following procedures should be followed by DNR staff reviewing proposed projects for potential impacts to the species.*

Follow the “Conducting Endangered Resources Reviews: A Step-by-Step Guide for Wisconsin DNR Staff” document (summarized below) to determine if Butler’s gartersnakes will be impacted by a project (WDNR 2012):



## Avoidance Measures

The following measures are specific actions typically required by DNR to avoid take (mortality) of state endangered or threatened species per Wisconsin's Endangered Species Law (s. 29.604, Wis. Stats.). These guidelines are typically not mandatory for non-listed species (e.g., special concern species) unless required by a permit, authorization or approval.

The Butler's gartersnake is listed as SC/H, which means that take is regulated by the establishment of open/closed seasons. Refer to the following Amphibian and Reptile Regulations, <http://dnr.wi.gov>, key word "herptile regulations".

If you have not yet read through *Screening Procedures*, please review them first to determine if avoidance measures are necessary for the project.

1. The simplest and preferred method to avoid take of Butler's gartersnakes is to avoid directly impacting individuals, known Butler's gartersnake locations, or areas of suitable habitat (described above in the "Habitat" section and in *Screening Procedures*).
2. If suitable habitat cannot be avoided, follow these time-of-year restrictions to avoid take:
  - Conduct work in non-overwintering areas (uplands) during the snake's inactive season (typically November 6 - March 14).
  - Install snake exclusion fencing according to the [Amphibian and Reptile Exclusion Fencing Protocols](#) in non-overwintering areas (uplands) during the snakes' inactive season (typically November 6 - March 14). Work can then be conducted within the fenced area at any time of year as long as the fencing is maintained.
3. When take cannot be avoided, we recommend referring to the *Management Guidelines* above for practices that can minimize impacts or even enhance habitat and improve this species' ability to persist over the long-term.

## Additional Information

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## Linked Websites

- Incidental Take Permit and Authorization: <<http://dnr.wi.gov>, key word “incidental take overview”>
- Natural Communities of Wisconsin: <http://dnr.wi.gov>, key word “natural communities”>
- Rare Animal Field Report Form: <<http://dnr.wi.gov>, key word “rare animal field report form”>
- Wisconsin Amphibian and Reptile Regulations: <<http://dnr.wi.gov>, key word “herptile regulations”>
- Wisconsin Endangered and Threatened Species: <<http://dnr.wi.gov>, key word “endangered resources”>
- Wisconsin Endangered and Threatened Species Permit: <<http://dnr.wi.gov>, key word “endangered species permit”>
- Wisconsin Natural Heritage Working List: <<http://dnr.wi.gov>, key word “Natural Heritage Working List”>
- Wisconsin’s Wildlife Action Plan: <<http://dnr.wi.gov>, key word “Wildlife Action Plan”>

### Funding

- USFWS State Wildlife Grants Program: <<http://wsfrprograms.fws.gov/subpages/grantprograms/swg/swg.htm>>
- Sadie Nolan Amphibian and Reptile Education and Conservation Memorial Fund
- Wisconsin Natural Heritage Conservation Fund

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