

# Worm-eating Warbler (*Helmitheros vermivorum*) Species Guidance

Family: Parulidae – the wood-warblers

**State Status:** [Endangered](#) (1989)

**State Rank:** [S1B](#)

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

**Global Rank:** [G5](#)

**Wildlife Action Plan**

**Mean Risk Score:** [3.6](#)

**Wildlife Action Plan Area  
Importance Score:** [2](#)



Counties with documented locations of Worm-eating Warbler breeding or breeding evidence in Wisconsin. Source: Natural Heritage Inventory Database, October 2018.



Photo by Lana Hays

## Species Information

**General Description:** The Worm-eating Warbler is approximately 13cm (5.1 in) long, and has a long, heavy bill and short tail. Male, female, and immature plumage is nearly identical in all seasons. The upperparts, wings, and tail are olive-green, head and underparts are buff-colored, and legs are pink. This species has distinctive black head stripes and a bill that is brownish-black above and pinkish below. The Worm-eating Warbler lacks wing bars or tail spots (Dunn and Garrett 1997, Hanners and Patton 1998).

The song is a loud, rapid, high-pitched trill, similar to that of the Chipping Sparrow. The pitch of the trill remains constant throughout the song. The primary call is a loud *zeep-zeep* or *tseet* (Dunn and Garrett 1997, Hanners and Patton 1998). An example of a typical song can be heard here: [http://www.allaboutbirds.org/guide/Worm-eating Warbler/sounds/ac](http://www.allaboutbirds.org/guide/Worm-eating_Warbler/sounds/ac)

**Definitive Identification:** The combination of plain olive-green upperparts, plain buffy underparts, and two pairs of blackish stripes on the head help to distinguish Worm-eating Warblers from similar species.

**Similar Species:** This species is visually distinctive and unlikely to be confused with any other warblers that occur in Wisconsin. The songs of the Worm-eating Warbler and the Chipping Sparrow, however, are difficult to distinguish.

**Associated Species:** Within appropriate upland hardwood forest types, Worm-eating Warblers can occur with the following Species of Greatest Conservation Need: Yellow-billed Cuckoo (*Coccyzus americanus*), Acadian Flycatcher (*Empidonax virescens*), Wood Thrush (*Hylocichla mustelina*), Cerulean Warbler (*Setophaga cerulea*), Kentucky Warbler (*Geothlypis formosa*), and Hooded Warbler (*Setophaga citrina*).

**State Distribution and Abundance:** The Worm-eating Warbler is an extremely localized breeder in the southern third of the state. Nesting is documented only from the Baraboo Hills region (Sauk Co.) but singing males have been detected elsewhere (Mossman and Lange 1982, Cutright 2006). Worm-eating Warblers occur regularly, and almost certainly breed, in Wyalusing State Park (Grant Co.) and adjacent upland forests along the lower Wisconsin River (M. Mossman pers. comm.). Distribution information for this species may not reflect its full extent in Wisconsin because many areas of the state have not been thoroughly surveyed.

**Global Distribution and Abundance:** The Worm-eating Warbler is found discontinuously from northeastern Kansas and southeastern Nebraska north to southern Wisconsin and southwestern Michigan, east to southern New England, and south to northeastern Texas, southern Gulf Coast states, northwestern Florida, northern Georgia and South Carolina. Within this range, highest densities of this species occur in the Appalachian region of Tennessee, Kentucky, West Virginia, and Virginia (Dunn and Garrett 1997, Hanners and Patton 1998, eBird 2011).

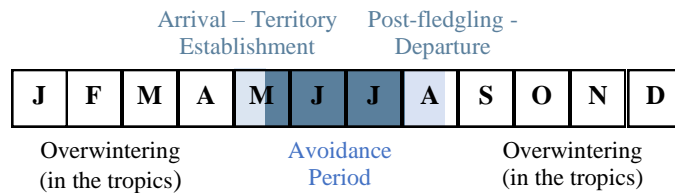


Global range map for Worm-eating Warbler. (NatureServe 2013)

The winter range extends from eastern and southern Mexico to central Panama. The Worm-eating Warbler also winters on Bermuda, in The Bahamas, and from Greater Antilles east to the Virgin Islands (Dunn and Garrett 1997, Hanners and Patton 1998).

**Diet:** Worm-eating Warblers are primarily insectivorous and prefer caterpillars (*Lepidoptera*) and other insect larvae, spiders (*Araneae*), and adult arthropods (Hanners and Patton 1998).

**Reproductive Cycle:** The Worm-eating Warbler is a rare spring migrant to southern Wisconsin and arrives from late April to early June (Robbins 1991). Information on this species' nesting phenology in Wisconsin is limited to a few expert observations: nest-building on May 17 and 20, food-carrying from June 13-16, and fledgling-feeding on July 5 (M. Mossman, K. Lange, M. Peterson pers. obs.). Nest-building occurs elsewhere in the Worm-eating Warbler range from late April to late May, and nestlings are present from late May to mid-July (Hanners and Patton 1998).



**Ecology:** The Worm-eating Warbler nests on hillsides or banks of ravines, often near streams. Nests are well concealed under dead leaves, and usually placed at the base of a shrub or sapling, among roots or in a slight cavity (Baicich and Harrison 1997, Hanners and Patton 1998). Female Worm-eating Warblers build bulky cup-nests composed of dead leaves, grasses, hair, and moss stems (Dunn and Garrett 1997, Hanners and Patton 1998). Females typically lay and incubate four to six eggs, with an average clutch size of five (Hanners and Patton 1998). Incubation lasts 11-17 days, and chicks fledge 10 days after hatching and remain with parents for an additional three weeks (Hanners and Patton 1998). This species raises only one brood but may re-nest if the first attempt fails (Hanners and Patton 1998).

**Natural Community Associations** ([WDNR 2005](#), [WDNR 2009](#)):

*Significant:* [southern dry-mesic forest](#)

*Moderate:* southern mesic forest, southern dry forest

*Minimal:* none

**Habitat:** The Worm-eating Warbler inhabits a variety of deciduous and mixed deciduous-coniferous forest types across its summer range, including eastern hemlock (*Tsuga canadensis*), beech-maple (*Fagus-Acer*), and oak-hickory (*Quercus-Carya*) (Hanners and Patton 1998). In the Baraboo Hills and Wyalusing-Millville areas of Wisconsin, breeding habitat consists of mature to old-growth dry oak or oak-pine (*Quercus-Pinus*) woods (Mossman and Lange 1982), and, less frequently, oak-dominated microsites among pine or hemlock relicts (M. Mossman pers. comm.). Within these tracts, territories are often established in areas with south-facing slopes, mature white oaks (*Quercus alba*), and in stands >500 acres (Mossman and Lange 1982, M. Mossman pers. comm.). Dense patches of shrub cover appear to be less characteristic of occupied habitat in Wisconsin than elsewhere in its range (Hanners and Patton 1998, M. Mossman pers. comm.).



Worm-eating Warbler nest. ©Dave Slager

**Threats:** Wisconsin is at the northern edge of the Worm-eating Warbler's breeding range, and thus this species has likely never been common in the state (Robbins 1991). The Wisconsin population faces a threat from the continued decline of oak. There is little acreage in oak-dominated forests of 100 years and older, and acreage of both the oldest and youngest age classes has been declining for several years on medium- to high-nutrient sites (USDA FS 2004). Oak regeneration on these sites is often difficult due to a variety of factors, perhaps most notably excessive deer browse and succession in the absence of fire and effective management regimes. Forest fragmentation and subsequent increases in predation and Brown-headed Cowbird parasitism also negatively impact the Worm-eating Warbler on the breeding grounds (Hanners and Patton 1998). Parasitism rates have been as high as 75% in Missouri and 71% in Maryland (Hanners and Patton 1998). Loss of tropical, broadleaf forests on the wintering grounds is also a concern (Hanners and Patton 1998).

**Climate Change Impacts:** Habitat models indicate an expansion in Wisconsin of suitable environmental conditions for oak-hickory forests (Swanston et al. 2011, WICCI 2011), but expansion depends on landscape connectivity and propagule (seed) availability. Although oak-hickory forest expansion might increase the amount of suitable forest cover for Worm-eating Warblers, the species'

dependence on additional forest characteristics (see “Habitat” section) will likely continue to limit its abundance in the state. Potential impacts of climate change include a decrease in Worm-eating Warbler abundance in the Appalachians due to projected increases in temperature and changes in seasonality (Matthews et al. 2004).

**Survey Guidelines:** Persons handling Worm-eating Warblers must possess a valid [Endangered and Threatened Species Permit](#). If surveys are being conducted for regulatory purposes, survey protocols and surveyor qualifications must first be approved by the Endangered Resources Review Program (see *Contact Information*). Area searches are effective for surveying Worm-eating Warblers in forest stands <100 acres. Survey the entire affected area that contains suitable Worm-eating Warbler nesting habitat (see “Habitat” section above) by walking slowly throughout the area and stopping occasionally to listen for Worm-eating Warbler vocalizations. Point counts can be used for stands >100 acres and require that the observer stand in one spot for 10 minutes and record all Worm-eating Warblers seen or heard within a 100m (330 ft) radius. Point count stations should be placed a minimum of 250m (820 ft) apart. For either the area-search or point-count method, record the following data: date, location (GPS waypoint in datum WGS84, Decimal Degrees), all Worm-eating Warblers seen or heard, numbers of pairs and juveniles, behavioral observations such as courtship displays or food carries, and other Species of Greatest Conservation Need that are present at the site. Whenever possible, also map the approximate territory boundaries.

Carry out surveys between June 1 and July 4, preferably 10 days apart, and including at least one survey <1 week prior to any proposed project activity that may impact Worm-eating Warblers (see *Screening Procedures*). Begin surveys within 15 minutes of sunrise and complete them within four hours, or no later than 10 am. Conduct surveys during appropriate weather (i.e., no fog, rain, or wind >10 mph; Ralph et al. 1993). Personnel conducting surveys must be able to identify Worm-eating Warblers by sight and sound. **Songs of Worm-eating Warbler and Chipping Sparrow are difficult to distinguish, and therefore visual identification is required to definitively identify this species.** At least three surveys conducted with the above protocol and yielding negative results are needed to determine that the species is not present at a site for the purposes of these guidelines.

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 typically 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.*

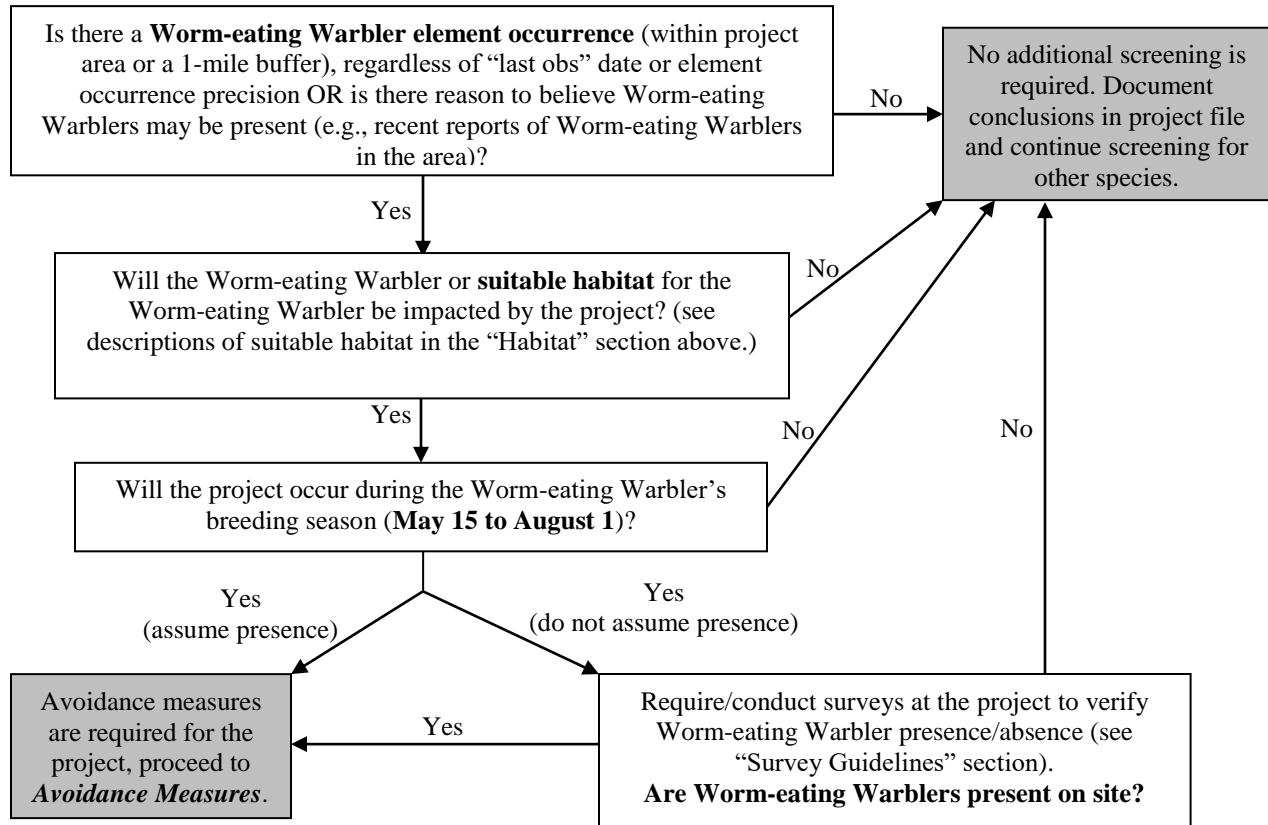
Worm-eating Warblers are extremely sensitive to management impacts, and efforts to maintain or enhance Worm-eating Warbler habitat should be carefully planned in consultation with a species expert to minimize negative short-term impacts (see *Contact Information*). Worm-eating Warbler conservation in Wisconsin requires maintaining large forest tracts (>500 acres) in rough terrain, especially in the Baraboo Hills, the Wyalusing-Millville region, and elsewhere in the Driftless Area (M. Mossman pers. comm.). However, Worm-eating Warbler distribution is patchy even in the core of its range (Hanners and Patton 1998), and management efforts for this species within large forests in Wisconsin should identify and concentrate on favorable microhabitats and suitable breeding habitat. Suitable breeding habitat has the following components: 1) forest stands dominated by mature oak trees, especially white oaks; 2) forest stands >500 acres; and 3) south-facing slopes. Management should focus on mature stands of oak (especially white oak), which must be maintained and restored with appropriate management practices and species-expert consultation.

Deer browse can severely limit habitat in some areas for this species, and in such areas, consideration should be given to lowering deer densities or otherwise protecting habitats from browse.

## Screening Procedures

The following procedures must 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 Worm-eating Warbler will be impacted by a project (WDNR 2012):



## Avoidance Measures

The following measures are specific actions required by DNR to avoid take (mortality) of state threatened or endangered 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.

According to Wisconsin's Endangered Species Law (s. 29.604, Wis. Stats.), it is illegal to take, transport, possess, process, or sell any wild animal on the Wisconsin Endangered and Threatened Species List (ch. NR 27, Wis. Admin. Code). Take of an animal is defined as shooting, shooting at, pursuing, hunting, catching or killing.

If *Screening Procedures* above indicate that avoidance measures are required for a project, follow the measures below. 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 Worm-eating Warblers is to avoid directly impacting individuals, known Worm-eating Warbler locations, or areas of suitable habitat (described above in the “Habitat” section and in *Screening Procedures*).
2. If Worm-eating Warbler impacts cannot be avoided entirely, avoid impacts during the **breeding season (May 15 to August 1)**. Worm-eating Warblers are extremely rare in Wisconsin and sensitive to management impacts, so impacts even outside the breeding season must be carefully planned in consultation with a species expert (see *Contact Information*).
3. If Worm-eating Warbler impacts cannot be avoided, please contact the Natural Heritage Conservation Incidental Take Coordinator and the Wisconsin DNR Worm-eating Warbler species expert (see *Contact Information*) to discuss possible project-specific avoidance measures. If take cannot be avoided, an [Incidental Take Permit or Authorization](#) is necessary.

## Additional Information

- Baicich, P.J., and C.J.O. Harrison. 1997. A Guide to the Nests, Eggs, and Nestlings of North American Birds. Second Edition. Natural World Academic Press, San Diego, CA. 347pp.
- Cutright, N.J. 2006. Worm-eating Warbler. *In* Atlas of the Breeding Birds of Wisconsin. (N.J. Cutright, B.R. Harriman, and R.W. Howe, eds.) The Wisconsin Society for Ornithology, Inc. 602pp.
- Dunn, J.L., and K.L. Garrett. 1997. A Field Guide to Warblers of North America. Houghton Mifflin Co., New York. 656pp.
- eBird. 2011. eBird: An online database of bird distribution and abundance [web application]. Version 2. eBird, Ithaca, New York. Available: <<http://www.ebird.org>> (Accessed November 2011).
- Hanners, L.A. and S.R. Patton. 1998. Worm-eating Warbler (*Helmitheros vermivorum*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <<http://bna.birds.cornell.edu/bna/species/367doi:10.2173/bna.367>>
- Matthews, S., R. O'Connor, L.R. Iverson, A.M. Prasad. 2004. Atlas of climate change effects in 150 bird species of the Eastern United States. Gen. Tech. Rep. NE-318. Newtown Square, PA; U.S. Department of Agriculture, Forest Service, Northeastern Research Station.
- Mossman, M.J., and K.L. Lange. 1982. Breeding Birds of the Baraboo Hills, Wisconsin: their history, distribution, and ecology. Department of Natural Resources and Wisconsin Society for Ornithology, Madison, WI. 196pp.
- NatureServe. 2013. Data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy - Migratory Bird Program, Conservation International - CABS, World Wildlife Fund - US, and Environment Canada - WILDSPACE. Data were accessed Jan. 2013.
- Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. General Technical Report PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 41pp.
- Robbins, S.D., Jr. 1991. Wisconsin Birdlife: Population and distribution past and present. Madison, WI: Univ. Wisconsin Press.
- Swanston, C., M. Janowiak, L. Iverson, L. Parker, D. Mladenoff, L. Brandt, M. St. Pierre, A. Prasad, S. Matthews, M. Peters, D. Higgins, and A. Dorland. 2011. Ecosystem vulnerability assessment and synthesis: a report from the Climate Change Response Framework Project in northern Wisconsin, Version 1. U.S. Department of Agriculture, Forest Service, Northern Research Station. <<http://www.nrs.fs.fed.us/pubs/38255>>
- WDNR [Wisconsin Department of Natural Resources]. 2005. Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need: A State Wildlife Action Plan. Madison, WI. <<http://dnr.wi.gov>, key word "Wildlife Action Plan">
- WDNR [Wisconsin Department of Natural Resources]. 2009. Wisconsin wildlife action plan species profile: Worm-eating Warbler. (accessed August 12, 2012). Madison, Wisconsin, USA. <material now available on the Natural Heritage Conservation species Web page: <http://dnr.wi.gov>, key word "biodiversity">
- WDNR [Wisconsin Department of Natural Resources]. 2012. Conducting Endangered Resources Reviews: A Step-by-Step Guide for Wisconsin DNR Staff. Bureau of Endangered Resources. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- WDNR [Wisconsin Department of Natural Resources]. 2013. Natural Heritage Inventory database. (accessed September 21, 2012).
- WICCI [Wisconsin Initiative on Climate Change Impacts]. 2011. Wisconsin's Changing Climate: Impacts and Adaptation. Nelson Institute for Environmental Studies, University of Wisconsin-Madison and the Wisconsin Department of Natural Resources, Madison, Wisconsin, USA. <[http://www.wicci.wisc.edu/report/2011\\_WICCI-Report.pdf](http://www.wicci.wisc.edu/report/2011_WICCI-Report.pdf)>
- USDA FS [United States Department of Agriculture, Forest Service]. 2004. Wisconsin's Forests. Resource Bulletin NRS-23. <[http://nrs.fs.fed.us/pubs/rb/rb\\_nrs23.pdf](http://nrs.fs.fed.us/pubs/rb/rb_nrs23.pdf)>. Accessed July 2012.

## Linked Websites:

- Cornell Lab of Ornithology All About the Birds: <[http://www.allaboutbirds.org/guide/Worm-eating\\_Warbler/id/ac](http://www.allaboutbirds.org/guide/Worm-eating_Warbler/id/ac)>
- 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 Initiative on Climate Change Impacts: <<http://www.wicci.wisc.edu/>>
- 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 Inventory Working List Key: <<http://dnr.wi.gov>, key word “Natural Heritage Working List”>
- Wisconsin Bird Conservation Initiative All Bird Conservation Plan: <<http://www.wisconsinbirds.org/plan/species/wewa.htm>>
- Wisconsin Wildlife Action Plan: <<http://dnr.wi.gov>, key word “Wildlife Action Plan”>

## Funding

- Natural Resources Foundation of Wisconsin: <<http://www.wisconservation.org/>>
- USFWS State Wildlife Grants Program: <<http://wsfrprograms.fws.gov/subpages/grantprograms/swg/swg.htm>>
- Wisconsin Natural Heritage Conservation Fund
- Wisconsin DNR Division of Forestry

## Contact Information (Wisconsin DNR Species Expert for Worm-eating Warbler)

- Refer to the Bird contact on the [Rare Species and Natural Community Expert List](#)

## Endangered Resources Review Program Contacts

- General information ([DNRRERReview@wisconsin.gov](mailto:DNRRERReview@wisconsin.gov))
- [Rori Paloski](#), Incidental Take Coordinator, Wisconsin DNR, Bureau of Natural Heritage Conservation (608-264-6040, [rori.paloski@wi.gov](mailto:rori.paloski@wi.gov))

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## Developed by

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