Black-throated Blue Warbler (*Setophaga caerulescens*) Species Guidance

Family: Parulidae – the wood-warblers

Species of Greatest Conservation Need (SGCN)

State Status: SC/M (Special Concern/Migratory Bird Protection) (1996)

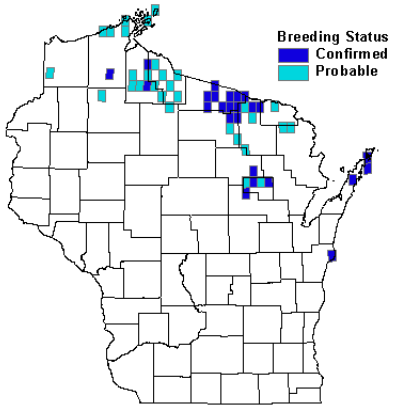
State Rank: S3B

Federal Status: none

Global Rank: G5

Wildlife Action Plan Mean Risk Score: 2.7

Wildlife Action Plan Area of Importance Score: 2



Black-throated Blue Warbler Breeding Locations from Breeding Bird Atlas (Cutright et al. 2006)

S. Maslowski, courtesy of US Fish and Wildlife Service.

Species Information

General Description: The Black-throated Blue Warbler is approximately 13 cm (5.1 in) long and highly sexually dimorphic. Males have deep blue crown and upperparts, black throat, cheeks, and sides, and white underparts. Males also have a bold white patch at the base of their primaries and white in the corners of their tails. Females have plain greenish-gray upperparts, a pale eyebrow, and buffy underparts. The white patch at base of females' primaries is generally smaller than in males, or occasionally absent. Immatures resemble adults of their respective sex (Howell and Webb 1995, Dunn and Garrett 1997, Holmes et al. 2005, Dunn and Alderfer 2006).

The Black-throated Blue Warbler song is a series of three to seven buzzy notes with the last note ascending in pitch: *zee zee zee zreeeeee*. The call is a sharp *stik* or *ctuk*, similar to that of a Dark-eyed Junco (*Junco hyemalis*) (Howell and Webb 1995, Dunn and Garrett 1997, Holmes et al. 2005, Dunn and Alderfer 2006). An example of a typical song can be heard here: <http://www.allaboutbirds.org/guide/Black-throated_Blue_Warbler/sounds>

Definitive Identification: Males' deep blue, black, and white color combination makes them unmistakable. Females' white wing patch at base of primaries, when present, is diagnostic.

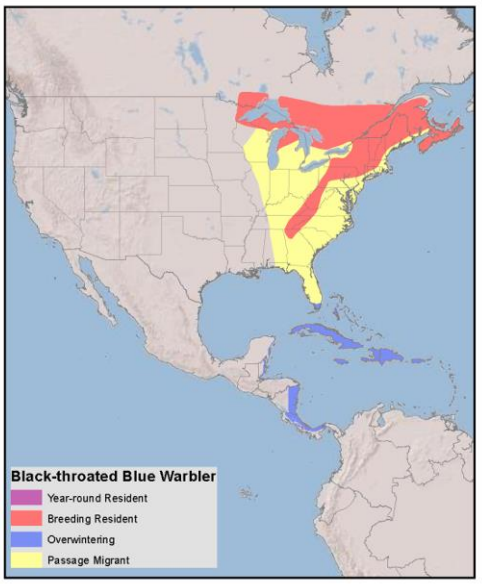
Similar Species: Female Black-throated Blue Warblers can be confused with female Tennessee Warblers (*Oreothlypis peregrina*) and female Orange-crowned Warblers (*Oreothlypis celata*). Female Tennessee and Orange-crowned warblers, however, do not have a contrasting dark cheek and pale throat and always lack a white patch at the base of their primaries (Dunn and Garrett 1997). In Wisconsin, these three species are most likely to co-occur during migration (Robbins 1991, Howe 2006, Wood 2006). The songs of Black-throated Blue Warbler and Cerulean Warbler share a similar buzzy tone, but the Black-throated Blue Warbler's song is slower with fewer notes (Dunn and Garrett 1997).

Associated Species: Within appropriate upland hardwood forest types, Black-throated Blue Warblers could occur with the following Species of Greatest Conservation Need: Northern Goshawk (*Accipiter gentilis*), Red-shouldered Hawk (*Buteo lineatus*), Least Flycatcher (*Empidonax minimus*), Veery (*Catharus fuscescens*), Wood Thrush (*Hylocichla mustelina*), and Canada Warbler (*Cardellina canadensis*).

State Distribution and Abundance: The Black-throated Blue Warbler breeds sparingly from Douglas County east across the northernmost tier of counties to Marinette County, and south into Oneida, Forest, Menominee, Shawano, and Door counties. Highest concentrations of this species are found in northern Forest and eastern Vilas counties (Robbins 1991, Howe 2006). 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 Black-throated Blue Warbler's summer range extends eastward from northeastern Minnesota, northern Wisconsin, northern Michigan, southern Ontario, southern Quebec, Nova Scotia, and New Brunswick; south into Maine, New Hampshire, Vermont, western Massachusetts, the Adirondacks of New York, Pennsylvania, western West Virginia, and the higher elevations of the southern Appalachians in eastern Kentucky, eastern Tennessee, western South Carolina, western North Carolina, and northern Georgia (Holmes et al. 2005). Highest densities occur in southern Ontario and Quebec, northern Maine, and scattered localities within the Appalachian Mountains (Sauer et al. 2008).

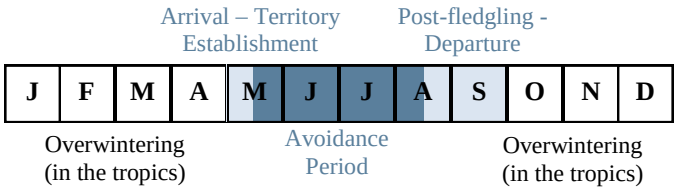
The Black-throated Blue Warbler's primary winter range includes The Bahamas, Cuba, Jamaica, Hispaniola, and Puerto Rico. Black-throated Blue Warblers occasionally winter in the Lesser Antilles and along the Caribbean coast of the Yucatan, Belize, and Honduras (Dunn and Garrett 1997, Howe et al 2005).



Global range map for Black-throated Blue Warbler. (NatureServe 2013)

Diet: Black-throated Blue Warblers are primarily insectivorous, and prefer adult and larvae forms of moths and butterflies (*Lepidoptera*), flies (*Diptera*), and spiders (*Araneae*) (Holmes et al. 2005).

Reproductive Cycle: Black-throated Blue Warblers arrive in Wisconsin from early to late May (Robbins 1991). Nest building begins in late May and nestlings are present from mid-June to late July, with later dates likely representing second nesting attempts (Howe 2006). This species departs Wisconsin from mid-August to early October (Robbins 1991).



Ecology: The Black-throated Blue Warbler nests and forages in the shrubby understory and lower canopy of large forest tracts (Holmes et al. 2005). Doran and Holmes (2005) characterized high-quality nesting sites as those with a greater proportion of deciduous vegetation and denser understory than surrounding sites. Elderberry (*Sambucus* spp.) is an important understory species for Black-throated Blue Warblers in Wisconsin (R. Howe pers. comm.), but most known plant associations come from studies elsewhere. Balsam fir (*Abies balsamea*) is an important nest substrate in the Upper Peninsula of Michigan, especially in heavily deer-browsed forests where it may be one of the few understory plants to thrive (Kearns et al. 2006). Nests in New England are often located in viburnum (*Viburnum* spp.), laurel (*Kalmia* spp.), raspberry thickets (*Rubus* spp.), and the saplings of spruce (*Picea* spp.), alder (*Alnus* sp.), beech (*Fagus grandifolia*), maple (*Acer* spp.) and yew (*Taxus* sp., a shrub that is now almost completely absent from Wisconsin; Holway 1991, Holmes et al. 2005).

Female Black-throated Blue Warblers build bulky cup-nests in forks of low shrubs or saplings 1-1.5 m (3-5 ft) above ground (Holmes et al. 2005). Nests are composed of fine bark strips, moss, dead leaves, spider webs, and rotten wood fragments (Baicich and Harrison 1997). The female lays and incubates 3-5 eggs, with an average clutch size of 4. Incubation lasts from 12-13 days, and chicks fledge 8-11 days after hatching and remain with parents an additional three weeks (Baicich and Harrison1997, Holmes et al. 2005). This species may raise up to three broods in some parts of its range (Holmes et al. 2005).

Most individuals leave the breeding grounds by flying southward along the Appalachian Mountains and eastern coast of the U.S., continuing south through Florida and then into The Bahamas and Greater Antilles. Black-throated Blue Warblers follow a similar migration route in both fall and spring (Dunn and Garrett 1997, Holmes et al. 2005).

Natural Community Associations (WDNR 2005, WDNR 2009):
Significant: northern mesic forest
Moderate: northern dry-mesic forest
Minimal: none

Habitat: The Black-throated Blue Warbler breeds in mature deciduous or mixed deciduous-coniferous forest stands that are typically > 100 ha (250 acres) (Robbins et al. 1989, Holmes et al. 2005). The Black-throated Blue Warbler in Wisconsin favors upland forests of maple or mixed northern hardwoods, and occasionally occurs in red pine (*Pinus resinosa*) plantations (Howe 2006). In the Upper Peninsula of Michigan, this species occurs in forests containing sugar maple (*Acer saccharum*), beech, aspen (*Populus* spp.), paper birch (*Betula papyrifera*), and American basswood (*Tilia americana*) (Kearns et al. 2006). This species does not commonly occur in young clear-cuts or second growth, but becomes frequent in structurally complex forests where the canopy is well developed and gaps allow the development of shrubs (Holmes et al. 2005). Within these tracts, territories are often established on steep slopes, heavily wooded ravines, or other areas with topographical relief (Mossman and Lange 1982, Holmes et al. 2005). Matteson et al. (2009) suggest that Black-throated Warblers prefer a minimum 70% canopy cover in mature (> 100 years old) mixed forests in Wisconsin.



Two examples of Black-throated Blue Warbler habitat in Wisconsin. Both photos depict northern mesic forest communities. Left photo from Copper Falls State Park © Brian Collins, right photo from Langlade County. Rich Staffen, Wisconsin DNR

Most forest stands occupied by Black-throated Blue Warblers contain a well-developed understory of deciduous shrubs or saplings (Doran and Holmes 2005, Holmes et al. 2005, Kearns et al. 2006). This species does not show a strong preference for particular understory species as long as a low-growing (< 2 m [6.5 ft]) dense shrub or sapling layer exists (Holmes et al. 1996, Holmes et al. 2005, Kearns et al. 2006). Holmes et al. (1996) reported Black-throated Blue Warblers being significantly more abundant in plots with an average shrub density of 1176 small stems/ha (476 stems /acre) compared to plots averaging 546 small stems/ ha (221 stems /acre). In the Upper Peninsula of Michigan, Kearns et al (2006) reported higher Black-throated Blue Warbler abundance in plots with approximately 40% understory cover compared to plots with 12% cover. In this study, Black-throated Blue Warbler abundance showed a positive association with balsam fir understory.

Black-throated Blue Warblers appear to tolerate a variety of silvicultural treatments if a dense understory layer is retained, and logging is conducted during the nonbreeding season. Jobes et al. (2004) found similar abundances in unharvested reference stands and stands subjected to recent selection cutting (1-5 years) where understory shrub cover measured 30-40% in the < 2 m (6.5 ft) height category, but lower abundance in stands harvested 15-20 years earlier with less understory cover. In Wisconsin, the most suitable structure is found where small, scattered gaps in the forest canopy create a dense understory layer of saplings or shrubs 1-3 m (3-10 ft) high (M. Mossman pers. comm.). Harris and Reed (2002) documented higher pairing success near clear-cut edges where understory density was high compared to forest interior sites with reduced understory density. In this study, understory density at forest edge sites ranged from 92.5-162 stems/transect within the 0.5 to < 2m height class, compared to forest interior sites that ranged from 55.2-56.6 stems/transect in the same height class.

Threats: Limiting factors for the Black-throated Blue Warbler are poorly known. Wisconsin is at the western edge of this species' breeding range (Robbins 1991), and it has therefore likely never been common in the state. Loss or fragmentation of mature, structurally complex forests may negatively impact this species (Matteson et al. 2009). Overbrowsing by deer can suppress populations locally by reducing the shrub layer available for nesting (WDNR 2005, Kearns et al. 2006, Matteson et al. 2009). For example, Hamady et al. (2000) suggest that that the loss of Canada yew in mature woods has negatively impacted Black-throated Blue Warblers. Impacts at migratory stopover sites or on the wintering grounds, such as habitat loss, also may be limiting this species (Sillett and Holmes 2002, Holmes et al. 2005).

Climate Change Impacts: The Black-throated Blue Warbler is highly vulnerable to projected climate change in Wisconsin, because the drier conditions predicted by climate change models will result in regeneration failure - as well as seedling and adult mortality - of most tree species favored by the species (see "Habitat" section; Swanston et al. 2011). Many northern hardwood tree species are expected to shift their range northward out of Wisconsin (WICCI 2011). Based on these projections, Black-throated Blue Warblers would be expected to exhibit a northward distribution shift to match these habitat changes. Potential impacts of climate change at the continental scale include a decrease in abundance and a contraction in range due to predicted losses of favored tree species (Matthews et al. 2004).

Survey Guidelines: Area searches are effective for surveying Black-throated Blue Warblers in forest stands < 100 acres. Survey the entire affected area that contains suitable Black-throated Blue Warbler nesting habitat (see "Habitat" section), by walking slowly throughout the area and stopping occasionally to listen for Black-throated Blue Warbler vocalizations during the active breeding season (June 1-July 4). Point counts can be used for stands > 100 acres, and require that the observer stand in one spot for 10 minutes

and record all birds seen or heard within a 100 m (330 ft) radius. Point-count stations should be placed a minimum of 250 m (820 ft) apart. For either the area-search or point-count method, record the following data: all Black-throated Blue 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 less than one week prior to any proposed project activity that may impact Black-throated Blue 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 Black-throated Blue Warblers by sight and sound. 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.

Black-throated Blue Warbler conservation in Wisconsin requires managing for a shrubby understory within mature deciduous or mixed deciduous forest stands > 100 ha. Focus conservation efforts within appropriate ecological landscapes, including forest transition, north central forest, northern highland, northern Lake Michigan coastal, and Superior coastal plain (WDNR 2005). Within these landscapes, key conservation sites include the Chequamegon-Nicolet National Forest in Ashland and Bayfield counties, Penokee Range Important Bird Area in Iron County, Plum Lake Hemlock Forest State Natural Area in Vilas County, Menominee Reservation in Menominee County, and Newport State Park and The Ridges Sanctuary in Door County.

Suitable breeding habitat for Black-throated Blue Warbler has the following components: 1) mature deciduous or mixed deciduous-coniferous forest, 2) dense understory cover (> 40%) of shrubs and saplings, 3) extensive forest tract, possibly > 100 ha (250 acres), 4) > 70% canopy cover, and 5) proximity to small canopy openings. Increase overall site suitability for this species by promoting a dense, low-growing (< 2 m [6.5 ft]) understory in large tracts of forest. In managed stands with a minimal understory shrub layer, practices that provide canopy gaps (i.e., single tree selection and group selection harvest) can increase understory shrub layer. Deer browse can severely limit habitat in some areas. Consideration should be given to lowering deer densities or otherwise protecting habitats from browse. Establish corridors > 100 m (330 ft) wide between existing forest stands to increase forest connectivity (DAI 2008).

Screening Procedures

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

Although the Black-throated Blue Warbler is listed as a species of special concern and included in the Natural Heritage Inventory (NHI) database, it is not formally tracked by NHI at this time. Because occurrences for this species are not available to NHI data users, direct observations or other non-NHI data sources would be needed to determine species presence or likelihood of presence. Please see the *Avoidance Measures* if you believe Black-throated Blue Warbler is present where you are working. Note that some users of this document may choose to assume presence based on habitat and location.

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.

Black-throated Blue Warblers are protected by the Federal Migratory Bird Treaty Act of 1918, which established a prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703). Contact the U.S. Fish and Wildlife Service directly for any permits related to the Federal Migratory Bird Treaty Act (see *Contact Information*).

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 Black-throated Blue Warblers is to avoid impacts to Black-throated Blue Warblers, known Black-throated Blue Warbler locations, or areas of suitable habitat (described above in the "Habitat" section and in *Screening Procedures*).

2. If Black-throated Blue Warbler impacts cannot be avoided entirely, avoid impacts during the **breeding season (May 16 to August 15)**.

3. If Black-throated Blue Warbler impacts cannot be avoided, please contact the DNR species expert (see *Contact Information*) to discuss possible project-specific avoidance measures.

Additional Information

References

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Linked Websites:

- Cornell Lab of Ornithology All About the Birds: <http://www.allaboutbirds.org/guide/black-throated_blue_warbler/id>
- 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 Bird Conservation Initiative All Bird Conservation Plan: <http://www.wisconsinbirds.org/plan/species/btbw.htm>
- Wisconsin Wildlife Action Plan: <http://dnr.wi.gov, key word "Wildlife Action Plan">
- 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 Natural Heritage Inventory Working List Key: <http://dnr.wi.gov, key word "Natural Heritage Working List">

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 Species Experts for Black-throated Blue Warbler)

- Mike Mossman, WI Department of Natural Resources, Bureau of Integrated Science Services (608-221-6346, michael.mossman@wi.gov)
- Kim Grveles, WI Department of Natural Resources, Bureau of Natural Heritage Conservation (608-264-8594, kim.grveles@wisconsin.gov)

Contact Information (Federal Migratory Bird Treaty Permits or Questions)

- Larry Harrison, U.S. Fish and Wildlife Service, 5600 American Blvd. West, Suite 990, Bloomington, MN 55437-1458 (612-713-5489, Larry_Harrison@fws.gov)
  - See also <http://www.fws.gov/migratorybirds/mbpermits.html>

Endangered Resources Review Program Contacts

- General information (608-264-6057, DNRERReview@wisconsin.gov)

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