

# Prothonotary Warbler (*Protonotaria citrea*) Species Guidance

Family: Parulidae – the wood-warblers

## Species of Greatest Conservation Need (SGCN)

State Status: [SC/M \(Special Concern/Migratory Bird Protection\)](#) (1992)

State Rank: [S3B](#)

Federal Status: [None](#)

Global Rank: [G5](#)

Wildlife Action Plan Mean Risk Score: [3.4](#)

Wildlife Action Plan Area Importance Score: [3](#)



Counties with documented locations of Prothonotary Warbler breeding or breeding evidence in Wisconsin. Source: Natural Heritage Inventory Database, August 2012.



Photo by Lana Hays

## Species Information

**General Description:** The Prothonotary Warbler is approximately 14 cm (5.5 in) long, with a heavy, pointed bill and short tail. Males have bright orange-yellow head and underparts, greenish upperparts, and unmarked bluish gray wings. The tail is bluish gray and has white spots on the outer feathers. The under-tail coverts, lower belly, and vent area are white. Adult females and immature birds have similar plumage but the upperparts and wing coloration are duller overall. Plumages are similar throughout the year (Dunn and Garrett 1997, Petit 1999).

The song is a repeated series of high-pitched notes: *tweet-tweet-tweet-tweet-tweet-tweet*. The primary call is a loud, sharp *tschip* (Dunn and Garrett 1997, Petit 1999). An example of a typical song can be heard here:

[http://www.allaboutbirds.org/guide/Prothonotary\\_Warbler/sounds](http://www.allaboutbirds.org/guide/Prothonotary_Warbler/sounds)

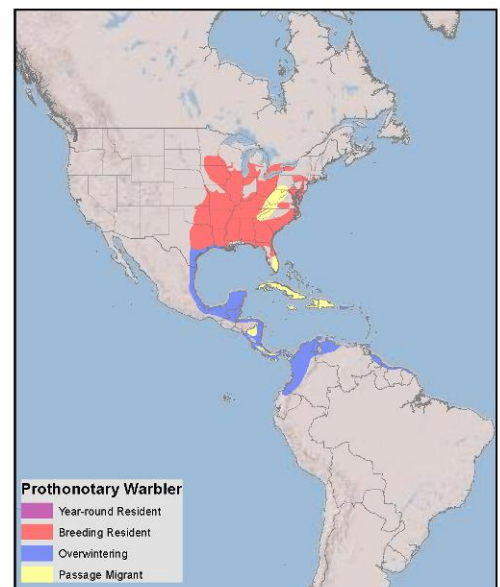
**Definitive Identification:** The bright orange-yellow head and underparts, greenish upperparts, and bluish gray wings and tail help to distinguish Prothonotary Warblers from other similar species.

**Similar Species:** Yellow Warblers (*Setophaga petechia*) resemble Prothonotary Warblers but have yellow tail spots, a smaller bill and yellow-green wings and tail, and the male has a streaked breast. Blue-winged Warblers differ by having a dark eye line and whitish wing bars (Dunn and Garrett 1997).

**Associated Species:** Within appropriate floodplain forests, Prothonotary Warblers can occur with the following Species of Greatest Conservation Need: Great Egret (*Ardea alba*), Red-shouldered Hawk (*Buteo lineatus*), Yellow-billed Cuckoo (*Coccyzus americanus*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), and Cerulean Warbler (*Setophaga cerulea*).

**State Distribution and Abundance:** The Prothonotary Warbler breeds sparingly throughout the southern two-thirds of the state. Highest known concentrations of this species occur in the floodplain forests along the Lower Wisconsin, Mississippi, Sugar, Lower Wolf, and Lower St. Croix rivers, where they can be locally common to abundant (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 Prothonotary Warbler's summer range extends from southern New Jersey to north-central Florida, west to east-central Texas, central Oklahoma, and eastern Kansas, and north to northern Missouri, central Wisconsin, and southern Michigan. This species is rare or absent from the Appalachian Mountains and patchily distributed in the northern tier of states. Within



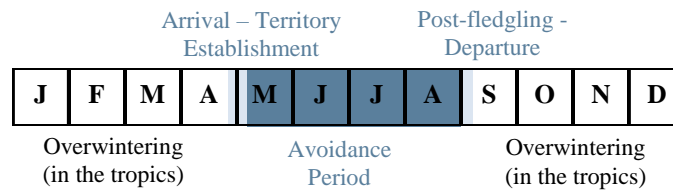
Global range map for Prothonotary Warbler. (NatureServe 2013)

this range, highest densities occur along the Mississippi River floodplain from Louisiana to Tennessee (Dunn and Garrett 1997, Petit 1999, eBird 2011).

The winter range extends from southern Mexico and northern Honduras, south to Panama, northern Columbia, and Venezuela. This species is a rare winter resident in Puerto Rico, Bermuda, the Virgin Islands, and Lesser Antilles (Dunn and Garrett 1997, Petit 1999).

**Diet:** Prothonotary Warblers are primarily insectivorous, and prefer adult and larval (caterpillar) forms of butterflies and moths (*Lepidoptera*), flies (*Diptera*), beetles (*Coleoptera*), and spiders (*Araneae*). They also occasionally feed on seeds and fruits, especially during the non-breeding season (Petit 1999).

**Reproductive Cycle:** Prothonotary Warblers arrive in Wisconsin from late April to late May (Robbins 1991). Nest building begins in mid-May and nestlings are present from mid-June to mid-July (Petit 1999, Flaspohler 2006). This species departs the breeding grounds by early September (Robbins 1991).



**Ecology:** The Prothonotary Warbler breeds in floodplain forests with suitable cavity trees (Petit 1999). It is the only warbler in the eastern U.S. that is an obligate cavity-nester, and it readily uses natural and woodpecker-excavated cavities as well as nest boxes (Petit 1999). This species prefers cavity trees 15-20 cm (6-8 in) in diameter at breast height (DBH; Petit 1999). Nests are typically located approximately two meters (6.5 ft) above slow-moving or standing water (Petit 1999).

Male Prothonotary Warblers place moss in potential nest cavities to attract females. Females construct the remainder of the nest foundation and lining. Materials used include moss and liverwort for the foundation; rootlets, bark, and plant down for the cup; rootlets, grasses, sedges, and leaves for the lining (Petit 1999). Female Prothonotary Warblers typically lay and incubate three to seven eggs, with an average clutch size of five (Petit 1999). Incubation lasts 12-14 days, and chicks fledge 10 days after hatching and remain with parents for an additional five weeks (Petit 1999). Second broods are common in the southern portion of the species' range, but less common in northern areas (Petit 1999).

Prothonotary Warblers are medium-distance migrants that fly from the eastern U.S. to the Yucatan and south to northern South America. In the spring, they depart the wintering grounds and move north along the Atlantic Slope of Central America and Mexico, and then across the Gulf of Mexico to the Gulf Coast of the U.S., continuing on to their breeding grounds (Petit 1999).

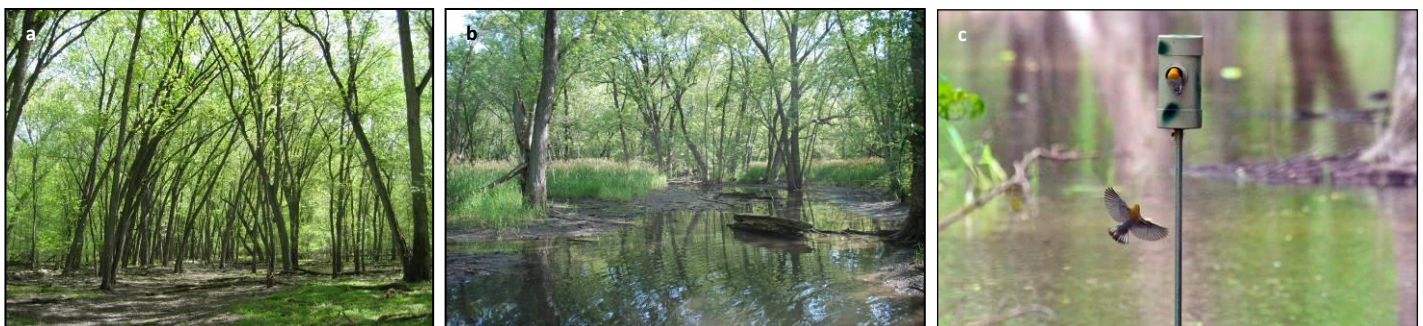
**Natural Community Associations** ([WDNR 2005](#), [WDNR 2009](#)):

*Significant:* [floodplain forest](#)

*Moderate:* none

*Minimal:* none

**Habitat:** The Prothonotary Warbler breeds in moist bottomland forests that are seasonally or permanently flooded. This species tends to be more common in functioning floodplain forests than in forests with altered flooding patterns (Cooper et al. 2009). Territories are often established in areas with standing water, such as oxbow ponds, sloughs, and slow-moving backwaters (Gannon 2005). Flooded forests may help to lower the risk of nest predation (Gannon 2005). Hoover (2006, 2009) documented decreased nest predation by raccoons, the primary nest predator for this species, with increased water depth below warbler nests. Nests over water > 55 cm deep



Prothonotary Warbler habitat photos (left to right): a) floodplain forest along the Rush River in Pierce County, R. Staffen, Wisconsin DNR; b) floodplain forest along the Sugar River in Rock County, A. Paulios, Wisconsin DNR; and c) a pair of Prothonotary Warblers utilizing an artificial nest box. ©Tom Schaefer

were particularly successful in these studies. Large forest patches (i.e., > 250 acres) also appear important to this species (Kahl et al. 1985). Sallabanks et al. (2000) documented a positive correlation between Prothonotary Warbler abundance and swamp forest patch size.

According to Petit (1999), essential habitat characteristics for Prothonotary Warblers include slow-moving or standing water, flat terrain, sparse understory, and trees with suitable cavities for nests (Petit 1999). Along the Mississippi River in Wisconsin, Prothonotary Warbler breeding habitat contains a variety of overstory trees, including swamp white oak (*Quercus bicolor*), silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), and river birch (*Betula nigra*). Dominant understory plants include woodbine (*Parthenocissus quinquefolia*), Canadian wood-nettle (*Laportea canadensis*), orange jewelweed (*Impatiens capensis*), violet (*Viola* spp.), and poison-ivy (*Rhus toxicodendron*) (Flaspohler 2006).

**Threats:** The Prothonotary Warbler's habitat specificity makes it highly vulnerable to loss of forested wetland habitats on both its breeding and wintering grounds (Petit 1999). Flood-control measures that result in drying of seasonally flooded areas reduce habitat availability and suitability (Petit 1999, Gannon 2005). Logging practices that remove cavity trees or decaying snags negatively impact this species (Petit 1999). Logging, insect infestations, or other disturbances that create open areas within bottomland hardwood forests may facilitate exotic plant establishment. Reed canary grass (*Phalaris arundinacea*), in particular, can dominate the ground layer, impede tree regeneration, and ultimately convert bottomland hardwoods to a habitat unsuitable for Prothonotary Warblers (Kreitinger and Paulios 2007). Brown-headed Cowbird parasitism is also a concern because parasitized nests suffer decreased hatching success, high nestling mortality, and low fledging rates (Petit 1999, Hoover 2003). Parasitism rates have been as high as 29% in Wisconsin (Flaspohler 2006), 43% in Arkansas (Gannon 2005), and 41-50% in southern Illinois (Hoover 2003).

**Climate Change Impacts:** The Prothonotary Warbler is highly vulnerable to projected climate change in Wisconsin because declines in soil moisture may reduce suitable growing conditions for bottomland hardwood forests (WICCI 2011) and thereby reduce the amount of available habitat. If climate change increases the frequency and intensity of summer storm and flood events, it may destroy low nests as has frequently occurred on the lower Wisconsin River in recent years (M. Mossman pers. comm.). Extreme and prolonged droughts may also negatively impact the species by drying backwater ponds and sloughs and reducing available breeding habitat (A. Paulios pers. comm.). Potential impacts of climate change at the continental scale include a northward expansion due to predicted increases in abundance of water oak (*Quercus nigra*) and winged elm (*Ulmus alata*), both of which occur in bottomland hardwood forests occupied by the Prothonotary Warbler in southern states. However, a rangewide decrease in population is projected due to the loss of this species across the southern part of its present range (Matthews et al. 2004).

**Survey Guidelines:** 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 Prothonotary Warblers in forest stands < 100 acres. Survey the entire area that contains suitable Prothonotary Warbler nesting habitat (see "Habitat" section) by walking or canoeing slowly throughout the area and stopping occasionally to listen for Prothonotary 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 Prothonotary Warblers 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: date, location (GPS waypoint in datum WGS84, Decimal Degrees), all Prothonotary 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 or areas of observed use.

Surveys should be conducted between May 20 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 Prothonotary 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 Prothonotary 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.

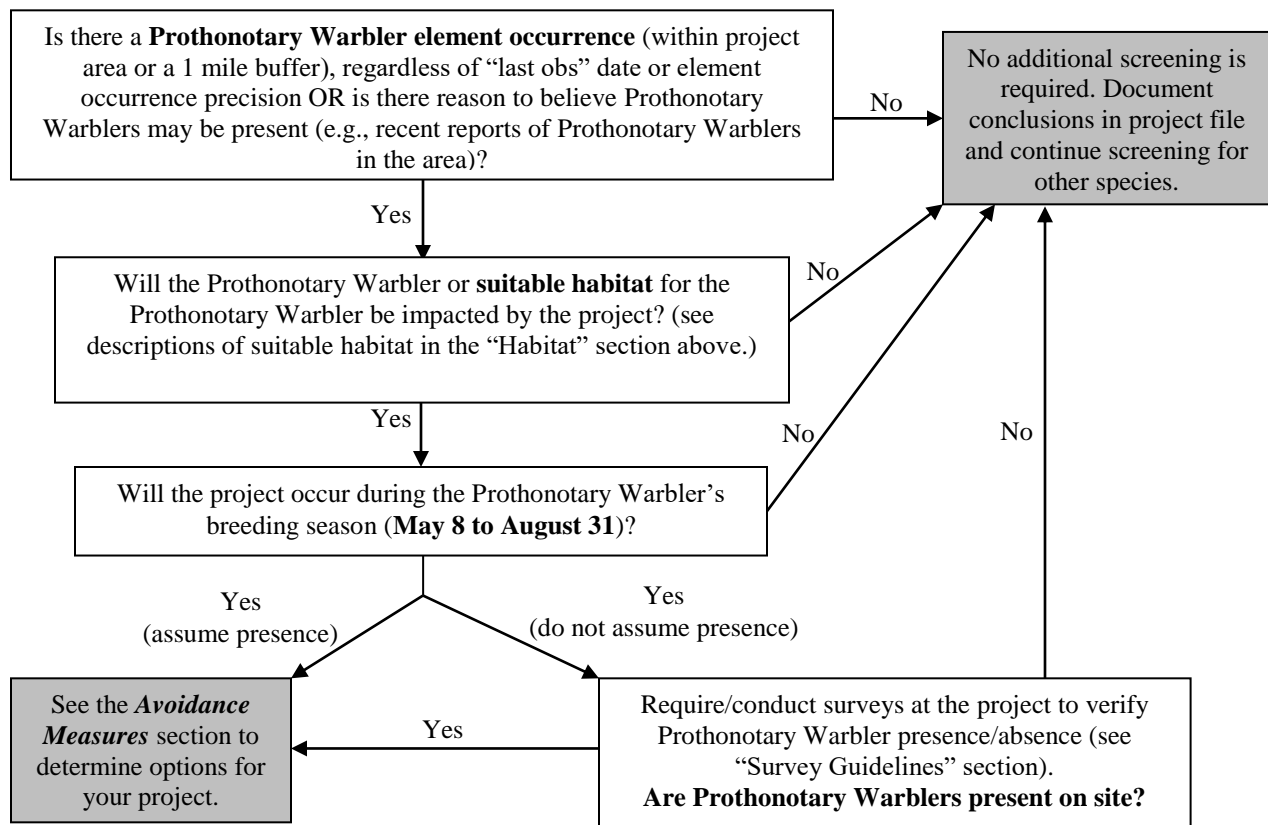
Prothonotary Warbler conservation in Wisconsin requires protecting large blocks of bottomland hardwood forest that include flooded or slow-moving channels, sloughs, pools, or backwaters. Suitable breeding habitat has the following components: 1) moist bottomland hardwood forest; 2) standing or slow-moving water (mostly canopy-covered); 3) trees with suitable cavities for nests; 4) flat terrain, or varied with pools and sloughs; and 5) sparse understory, especially within 20 m (66 ft) of water that is suitable (deep enough) for nesting. Focus conservation efforts within appropriate ecological landscapes, including [central Lake Michigan coastal](#), [central sand plains](#), [southeast glacial plains](#), [western coulee and ridges](#), and [western prairie](#) (WDNR 2005). Within these landscapes, potential conservation sites include the floodplain forests along the lower Wisconsin, Mississippi, Sugar, lower Wolf, lower St. Croix, and Rock rivers, often including the lower, swampy reaches of inflowing tributaries (Flaspohler 2006, Kreitinger and Paulios 2007). The application of spatial habitat models from the Wisconsin Stopover Initiative (Grveles et al. 2011) and the identification of important stopover sites will aid management and conservation efforts.

Increase overall site suitability for this species by retaining trees or snags with cavities suitable for nesting 0.5-3.5 m (2-12 ft) above the water or ground (Steele 2010). Nest boxes may provide alternative nesting substrates within appropriate habitat. Enlarge existing forest stands to > 250 acres by planting trees along the forest edges and in openings. Buffer the wet zones of bottomland hardwood stands with additional tree plantings, when necessary, to improve overall site suitability for Prothonotary Warblers. Manage for non-linear forest stands by planting trees to form round edges along a forest stand (DAI 2008). Select tree species that are appropriate for the region, considering its projected future climate, and soil type (see “Habitat” section). Retain forested-riparian areas 400 m (1300 ft) wide, and when possible, increase the width of all forested-riparian areas (Peak and Thompson 2006). Maintain an open understory and help secure forest regeneration by controlling or eliminating invasive plant species. Reed canary grass can quickly proliferate following harvest, sometimes to the point of inhibiting tree regeneration, so carefully consider the risks when conducting timber harvest in places where it is present.

## 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 Prothonotary 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.

Prothonotary 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 US Fish and Wildlife Service directly for any permits related to the Federal Migratory Bird Treaty Act (see *Contact Information*).

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 Prothonotary Warblers is to avoid impacts to Prothonotary Warblers, known Prothonotary Warbler locations, or areas of suitable habitat (described above in the "Habitat" section and in *Screening Procedures*).
2. If Prothonotary Warbler impacts cannot be avoided entirely, avoid impacts during the **breeding season (May 8 to August 31)**.
3. If Prothonotary 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/prothonotary\\_warbler/id/ac](http://www.allaboutbirds.org/guide/prothonotary_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 Bird Conservation Initiative All Bird Conservation Plan: <<http://www.wisconsinbirds.org/plan/species/prow.htm>>
- 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 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 Experts for Prothonotary Warbler)

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

### 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](mailto:Larry_Harrison@fws.gov))
- See also <<http://www.fws.gov/migratorybirds/mbpermits.html>>

### Endangered Resources Review Program Contacts

- General information ([DNRERReview@wisconsin.gov](mailto:DNRERReview@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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