Credit Rebecca Field

Wood Thrush
Minnesota Conservation Summary

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The *Blueprint for Minnesota Bird Conservation* is a project of Audubon Minnesota written by Lee A. Pfannmuller (leepfann@msn.com) and funded by the Environment and Natural Resources Trust Fund. For further information please contact Mark Martell at mmartell@audubon.org (651-739-9332).

Wood Thrush

Priority for Minnesota's Bird Conservation Plan:
- Boreal Hardwood Transition: High Level Priority
- Prairie Hardwood Transition: Moderate Level Priority

Other Status Classifications:.
- Minnesota Species in Greatest Conservation Need
- On Audubon Minnesota's Action List
- Identified as a Yellow Watch List Species by National Audubon (2007)
- USFWS Bird of Management Concern in the Midwest Region (1995)
- USFWS Focal Species (2005)
- USFWS Bird of Conservation Concern in BCR12, 22, the Midwest Region and Nationally (2008)
- Focal Species for the Upper Mississippi Valley/Great Lakes Joint Venture Region
- Identified by Partners in Flight (PIF) Tri-National as a species of High Tri-national Concern
- Identified by PIF as a Species of Continental Concern; Action is Management
- PIF BCR12: Continental Concern and Regional Concern Species: Action is Management
- PIF BCR22: Continental Concern and Regional Concern Species: Action is Critical Recovery
- PIF BCR23: Continental Concern Species: Action is Planning and Responsibility

Population Information:
- U.S. and Canada population estimate: 14,000,000 (U.S. PIF Plan)
- Continental Population Objective: Increase 50% (PIF)
- Current population estimate in the UMVGL JV Region: 1,402,530; Target is 2,102,450; deficit is 699,920
- Minnesota's population in the UMVGL JV region of the state is: 62,630; Target is 110, 950; Minnesota deficit is 48,320
- Estimated Minnesota population: 75,000; Objective is to increase the population 50%; Target Population is 110,000
    - ✓ Estimated MN population in BCR11: 1,500; Target is 2,300
    - ✓ Estimated MN population in BCR12: 51,000; Target is 77,000
    - ✓ Estimated MN population in BCR22: 630; Target is 950
    - ✓ Estimated MN population in BCR23: 22,000; Target is 33,000

Minnesota BBS Data:
- Yellow level of regional credibility
- 1966-2009: decreasing trend (not statistically significant) of 0.0; 1999-2009: decreasing trend of -4.6
- Minnesota does not have one of the species centers of distribution
- 0.6% of the Wood Thrush's global population occurs in Minnesota; 5.71% of the Veery's breeding range occurs in MN
- BBS Average # birds/BBS Route is 0.48; present on 30/74 BBS routes
- Increasing trend on the Chippewa National Forest (91-07)

Minnesota Residency:
- Breeds primarily in eastern and central Minnesota
- The species reaches the northwest limit of its range in Minnesota; it is numerous along the Mississippi River and its tributaries and locally from the maple-basswood forests of central and northcentral regions of the state, to the hardwood forests in Cook County (NRRI Species Account)

Habitat Requirements: Forest

Interior and edges of deciduous and mixed forests, especially well-developed, upland, mesic ones; more likely to occur in larger-area forests but may nest in 1-ha fragments and semi-wooded residential areas and parks; elements of oft-used sites: trees >16 m in height, variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (Birds of North America).

From Land Manager's Guide to Improving Habitat for Forest Thrushes

- Thrushes are birds of the forest understory, requiring dense shrub or sapling layers and a well-developed layer of leaf litter on the forest floor. These conditions exist in some mature and old-growth forest types, but most often are enhanced by small-scale disturbances within forested regions.
- In the East/Midwest Region (BCR11/23 in Minnesota) the wood thrush is the most common thrush. Although often considered a bird of mature, intact forests, this species shows much variability in habitat preferences across its range and it certainly inhabits small woodlots in highly fragmented landscapes. However, populations in highly fragmented forests may not be sustainable, perhaps contributing to regional population declines
- Appear to select habitats based more on the structure of the forest than on the degree of forest fragmentation in the landscape.
- Proved to be area sensitive although the size of patches required did not appear to change with amount of forest fragmentation in the landscape.

From UMVGL JV Landbird Plan Species Account:

- Edges and interior portions of mature mesic deciduous or mixed forests with a well-developed understory. Optimal habitat consists of bottomland hardwood forest.
- Daily survival rates of eggs and young are less in edge (<200 m from edge of the forest) than the interior in fragmented landscapes (<50% forested) but not in intact landscapes (>75% forested). Productivity is higher in 15 ha woodlots compared to those <2.1 ha.

From Wisconsin Bird Conservation Initiative (WBCI) Species Profile:
The Wood Thrush occurs mostly in upland, moist forests with large trees, diverse tree communities, moderate undergrowth, and ample leaf litter. In areas of sympatry with the Veery, the Wood Thrush prefers more mature forests with more canopy cover, fewer shrubs, and more leaf litter.

Although the Wood Thrush is considered to be area sensitive, the amount of core habitat within 5 km of a nest may be a better predictor of nest success than the amount of total forest cover.

From NRRI Species Account:

- The Wood Thrush breeds primarily in mesic deciduous forest. It is also found in mixed forests with a well-developed understory and on occasion, in urban habitats.
- In Minnesota it is more common in moderately aged (15-40 year old) deciduous forests, but also has been observed in mixed habitats such as fir-spruce-birch forest type. The species is classified as a hardwood and mature forest dependent species.

From New York Department of Conservation Species Account:
The species breeds in the interior and edges of mature deciduous or mixed forests with a dense understory of saplings and shrubs, shade, a fairly open forest floor, moist soil, and leaf litter. It is most often found in forests larger than 200 acres, but may nest in fragments as small as 2.5 acres as well as wooded residential areas and parks, although nesting success in smaller fragments is problematic.

From Bird Conservation: Western Great Lakes Region:

- Prefers interior and edges of deciduous and mixed forests, especially well-developed, upland mesic areas.
- Key elements include trees greater than 16m in height, high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter.
- Forages in leaf litter or on semi-bare ground where herbaceous cover is open
- Cowbird parasitism rates most extreme in Midwest and least in the East.

Area Sensitivity:
- Medium sensitivity to forest fragmentation (Driftless Area Initiative)
- Forest fragmentation may cause lower reproductive success. Although Wood Thrush nests in very small woods and residential areas, this species is area sensitive.

Migration: Neotropical

Climate Change Vulnerability: Low (1); climate change models predict no change in the Wood Thrushes distribution but an increase in its abundance in Minnesota.

Threats/Issues:

From WBCI Species Profile:
- Loss and degradation of forest habitat
- Current forest management practices, grazing, and invasive species have resulted in changes to forest composition and structure that are not always amenable to Wood Thrush.
- Donovan et al (1995) found parasitism caused 22-32% of all nest mortality in fragmented forests in Minnesota, Wisconsin and Missouri, but 0% in predominantly forested landscapes.
- Tropical deforestation on the wintering grounds is also a concern.

From Birds of North America Species Account:
- Hames et al. (2002, 2006) found the probability of breeding by Wood Thrush across its geographic range decreases as acid rain deposition increases, with breeding probability decreasing further when acid rain co-occurs with habitat fragmentation. Acid rain decreases soil pH (resulting in decreased calcium content in the soil) and may influence the abundance of calcium-rich invertebrate prey available for Wood Thrush.
- Sensitive to forest fragmentation; growing evidence suggests a complex response to fragmentation that depends on the nature of the fragmentation, the level of fragmentation across the landscape, and the geographic region inhabited.
- Not all fragmentation appears to have negative consequences for the species.
- Cowbird parasitism levels are likely to be exacerbated by habitat fragmentation.
- Subjective rankings of Neotropical migrants to identify species of management concern in different regions usually place the Wood Thrush in the Top 10% among species of mature deciduous forests, second only to Cerulean Warbler.

From New York Department of Conservation Species Account:
- Forest destruction and fragmentation due to suburban and commercial development.
- Nest predation by Brown-headed Cowbirds in fragmented forests that result in lower reproductive success
- Destruction of understory due to over-browsing by white-tailed deer.

OVERALL MINNESOTA GOAL: Eliminate state population deficit over a 15 year period through effective and efficient habitat conservation.

BEST MANAGEMENT PRACTICES

From A Land Manager's Guide to Improving Habitat for Forest Thrushes:

- Silvicultural practices that mimic natural disturbance ad promote deciduous shrubs and saplings can benefit thrush populations, as long as overall forest cover in a landscape is not permanently reduced.
- In all forested regions, general guidelines for thrushes and other forest species include:
    1. Maintaining large and unfragmented forest blocks
        a. Minimize isolation of forest patches by promoting reforestation of gaps between disconnected forest tracts
        b. Attempt to manage for forest shapes that create the least amount of edge.
        c. Develop a long-range forest management plan at as large a scale as possible
        d. Promote reforestation of artificial forest opening, areas surrounding forest peninsulas, gaps between isolated forest tracts and riparian corridors to create more forest interior.
    2. Promoting understory growth through natural disturbance or management
    3. Limiting overbrowsing by deer, livestock, and other ungulates
    4. In eastern and northern forests, patches of 150 acres (62 ha) or larger generally will provide thrushes with high to moderate levels of habitat suitability.
- East/Midwest Region:
    1. High suitability forest patches are at least 200 acres (80 ha) and suitability declines rapidly in patches less than 100 acres (40 ha).
    2. A dense understory of saplings and shrubs is a key habitat requirement.
- Northern Forest Region
    1. In landscapes with 70% forest cover, 200 ares (80 ha) patches are required to achieve high suitability for the Wood Thrush; as forest cover drops below 40%, high habitat suitability can not be achieved.
    2. Common only in the transitional mixed, hardwood forests around the Great Lakes and strongy tied to the deciduous components of these forests.

From Wisconsin Bird Conservation Initiative Species Profile:

- Maintain large blocks of unfragmented hardwood forest with scattered canopy gaps and patches of dense saplings.
- Reducing forest fragmentation by increasing forest patch size, increasing the proportion of interior to edge, and avoiding the placement of clearcuts in the immediate vicinity of stands with high conservation value or restoration potential also is warranted.
- Managers should focus more on providing unfragmented core habitat as well as regional forest cover.

From BNA Species Account:

- On breeding grounds, protection of temperate deciduous forests over the entire geographic range, especially ones > 100 ha in size with few roadcuts.
- Connectivity among forest fragments is also important.

From New York Department of Conservation Species Account:

- Maintain forest blocks greater than 250 acres with a dense understory of saplings and shrubs
- Minimize edges and create corridors between smaller forest patches to increase habitat quality.
- Create gaps in the forest canopy so that young saplings and shrubs can grow to provide cover
- Limit overbrowsing by deer.

From PIF Physiographic Region 20 Plan for the Boreal Hardwood Transition Zone: Forest Species (recommendations relevant to Wood Thrush):

- Preserve large tracts of mature coniferous and mixed forest edge contiguous to large inland lakes, including the Great Lakes.
- Where possible, maximize the amount of forest interior (and minimize disturbance within it) to benefit area-sensitive and forest-interior species. Openings, including roads and power lines, should be concentrated along existing edges (Faaborg et al. 1995).
- Maintain a minimum 70% canopy cover in mature (>100 years old) mixed forests. Encourage good sapling development at these sites to provide nesting and foraging sites for Veeries, Black-throated Blue Warblers, and Wood Thrushes.
- Promote structural diversity (vertical and horizontal) at the landscape scale, including patches of early-, mid-, and late-successional forest in a range of patch sizes (Thompson et al. 1995).
- Control white-tailed deer populations to minimize adverse impacts of overbrowsing and increase vertical foliage diversity (Faaborg et al. 1995).
- Favor yellow birch, which supports high invertebrate populations, over sugar maple in selection harvests to benefit foliage-gleaning birds such as Black-throated Blue Warbler (Holmes and Robinson 1981, DeGraff 1987).
- Maintain scattered conifers in hardwood stands, as they are used extensively by species such as Blackburnian Warbler and Black-throated Green Warbler (DeGraff 1987).
- Maintain a hardwood component in regenerating conifer plantations (Thompson et al. 1995).

MONITORING RECOMENDATION

From UMVGL JV Landbird Plan Species Account:
The Federal Breeding Bird Survey may be insufficient as Wood Thrushes prefer the interior of forest. Species-specific surveys would provide a better estimate of population trend.

CONSERVATION ACTIONS

- Identify and target high priority landscapes and habitats for conservation action

  Action: Identify Important Bird Areas that are a priority for this species in Minnesota

- Preserve large, high quality marshes with tall, dense vegetation and having a substantial buffer of undeveloped upland.

- **Upper Mississippi Valley/Great Lakes Joint Venture Region**:

  Action: Protect a total of 736 km^2 of habitat in the UMVGL JV region of Minnesota (510 km^2 in BCR12, 6 km^2 in BCR22 and 220 km^2 in BCR23) and restore a total of 373 km^2 of habitat in the UMVGL JV region of Minnesota (260 km^2 in BCR12, 3 km^2 in BCR22 and 110 km^2 in BCR23) at multiple sites within the current breeding range.
  Action: Connect existing forest to achieve large habitat blocks with minimal edge.

  Note: In the PIF Physiographic Area 16 (Upper Great Lakes Plain) Management Plan, the Cerulean Warbler is considered a strong surrogate for many forest dwelling songbirds in this region. The plan recommends establishing 10 Cerulean Warbler Conservation Areas in this region. The habitat recommendation in the UMVGL Joint Venture plan should follow the general recommendations for establishment of the Cerulean Warbler Conservation Areas which are as follows:

  1. Core blocks of mature, mesic hard wood forest (>1730 acres) with low edge-to-area ratio within an approximately 10,000 matrix.
  2. The surrounding matrix should be >50% forested, with >25% mature forests and <15% hostile habitat.

3. Within the core block at least 25% of the canopy tees should be mature trees >20 m in height and 25-55 cm dbh with canopy cover 65-85%.
4. Management should emphasize long rotations and strategies that produce a varied 3-dimensional stand with extensive development of vertical diversity and canopy gaps.
5. An open forest understory is also recommended. (additional recommendations are included)
6. Restored streams and rivers should retain a high quality vegetated riparian zone five times the width of the normal stream channel to restore meanders, oxbows, and the full range of native riparian vegetation.

Note: The plan notes that one large block of forest that meet these criteria in Minnesota is the Whitewater Wildlife Management Area.

Action: Restore forests to >70% of the landscape in 3 ecoregional subsections (17 total in PIF16) (Albert 1995) within the current distribution of the Cerulean Warbler in PIF16. Within these subsections, implement the CWCA described above. (Allow trees to attain maturity and remain standing after death. Conserve cavity-producing trees within harvested stands.)(PIF 16 Plan)

Action: Restore 2,000 km of riparian zones along streams and rivers within PIF16. Restored streams and rivers should retain a high quality vegetated riparian zone 5 times as wide as the normal stream channel. Forested riparian buffers should strive for a diverse native tree community. Restoration should focus on a continuum of stream size, from small, headwater streams to large, continental riparian systems like the Mississippi River. (PIF 16 Plan)

- Broad conservation actions for landbirds from the UMVGL JV LBP:
  1. Follow available "best practices" guidelines for land managers.
  2. Promote landbird planning and conservation across ownerships, states, JV regions, and international boundaries
  3. Focus on land supporting viable populations of JV Focal species in relatively unfragmented landscapes >10,000 ha and with fewer threats.
  4. Emphasize conservation on landscapes >70% intact (undeveloped) and contain core sites with source populations of JV focal species. Landscapes with <70% natural cover should also be conserved if focal species habitat needs are met, especially if there are few or no landscapes meeting the 70% criteria. In landscapes with <70% natural cover, retain or increase size of forest and grassland tracts, especially in central parts of the JV region.
  5. Improve monitoring for species whose main breeding range is north of the BBS coverage area.
  6. Create coordinated conservation programs in countries where birds winter and migrate, including identification, protection and management of key sites.
  7. Identify and/or maintain critical breeding areas for species where this JV is particularly important to breeding populations.

- **Boreal Hardwood Transition Zone (BCR12)**

  Action: Establish multiple Forest Bird Conservation Areas within BCR12 that are large enough to maintain or restore components of the historic landscape that are important to birds. Each FBCA should be 4,500 hectares (11,000 acres) in size, each with an old-growth core of 3,000 hectares (7,400 acres). Where FBCA management units cannot be designated, satellite FBMAs should be established. In general, 1,000 contiguous hectares (2,300 acres) of forest will meet the habitat area requirements of many priority forest birds.

The overall objective in establishing Forest Bird Conservation Areas (FBCAs) is to provide a framework for the long-term conservation of forest birds by applying general strategies known to benefit both bird generalists and specialists:

1. Maintain large contiguous forest tracts and manage in large blocks
2. Restore connectivity between large tracts
3. Minimize isolation of forest patches
4. Maintain a well-developed and diverse understory
5. Encourage a variety of seral stages and more forest interior for area-sensitive species
6. Limit narrow, linear tracts to reduce the ratio of edge to interior in managed areas.
7. Establish an old-growth core reserve area (surrounded by a buffer zone where no silvicultural activities occur) to benefit forest-interior species and other priority species.

The PIF Plan suggests the following sites in BCR12 of Minnesota as potential FBMAs:

1. Beltrami Island State Forest
2. Boundary Waters Wilderness Canoe Area
3. Chippewa and Superior National Forests
4. Itasca State Park
5. Voyageurs National Park

RESEARCH NEEDS

From UMVGL JV LP Broad Landbird research needs (A set of even more specific objectives is listed for each of these items)

- Identify landscape and habitat characteristics (e.g., composition, structure, configuration) associated with high productivity and/or survivorship, including source populations. This information is needed to help ensure viable breeding populations at objective levels set for the region.
- Refine breeding density estimates across the JV region and improve models used to calculate habitat objectives. JV focal species whose estimated habitat requirements exceed the estimated habitat available should be completed first. This information is necessary to determine the location and amount of habitat needed to meet population objectives.
- Improve understanding of habitat requirements, management needs, and landscape attributes for species of high conservation concern (e.g. Kirtland's Warbler). This information is needed to develop site specific management protocols for bird population maintenance and restoration.
- Quantify fine scale site characteristics important to JV focal species by providing information for explicit habitat prescriptions and identifying research/monitoring needs for fine scale characteristics that are unknown. This information is needed to develop site specific management protocols for bird population maintenance and restoration.

From PIF Plan for Physiographic Region 16; forest recommendations for further research

- Little is known about the breeding biology and species-specific responses to management of forest-nesting species within PIF16. More information is needed about habitat associations, densities, and reproductive success in oak hickory forests like those of PIF16, especially for the Cerulean Warbler, Acadian Flycatcher, Kentucky Warbler, Canada Warbler, Whip-poor-will, Hooded Warbler, Mourning Warbler, Wood Thrush, and Yellow-throated Warbler.
- Habitat factors limiting reproductive success, such as thresholds of forest size, landscape context, and forest plant community characteristics should be identified to avoid population declines in the future. Changes in timber management, economics, and the demographics of private landowners may also influence habitat quality in the future. Identifying and monitoring the large-scale factors that limit regional populations of forest-nesting birds is necessary, even for species with currently stable populations.
- Model forest habitat quality using GIS to enhance science-based management of bird habitats in PIF16. Identify large tracts of forest habitats in PIF16 as a basis for conservation planning, including

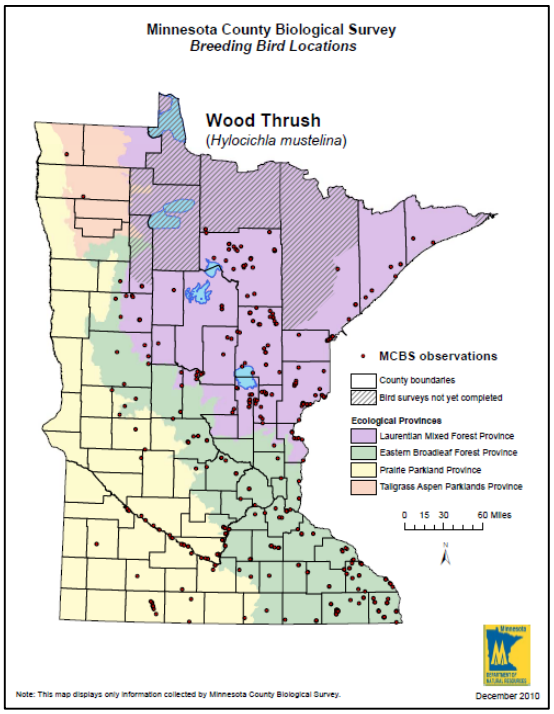
all forest tracts >4000 ha (10,000 acres), all ecoregional subsections with >50% forest cover, and high quality riparian corridors.
- Research factors contributing to forest and riparian bird population stability, including associations between landscape factors and indices of reproductive success and the effectiveness of the CWCA model in sustaining populations of high priority species.
- Identify cost-effective methods for identifying bird population sources in forested habitats.

From WBCI, Species Profile:
- More research on the habitat features associated with reproductive success is needed to manage critical habitat for Wood Thrush populations.
- Studies investigating the wintering areas of specific breeding populations are warranted.
- Need to assess the outcomes of various stand and landscape level management plans

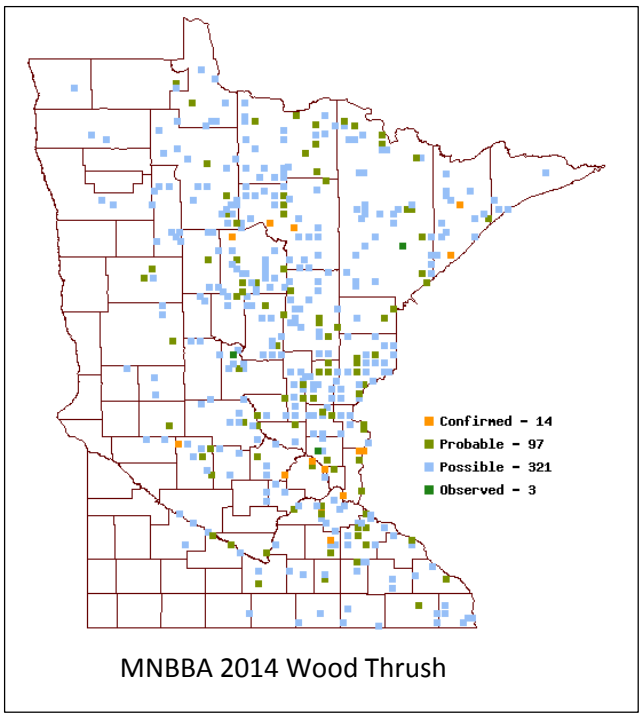
Effectiveness Measure: Eliminating the current population deficit requires a 50% population increase. Management actions should results in a 50% increase in BBS index or an average of 3% annually over a 15 year period.

Wood Thrush Distribution Maps

Birds of North America http://bna.birds.cornell.edu/bna/



MN DNR http://www.dnr.state.mn.us/eco/mcbs/bird_map_list.html



MN Breeding Bird Atlas http://www.mnbba.org/