



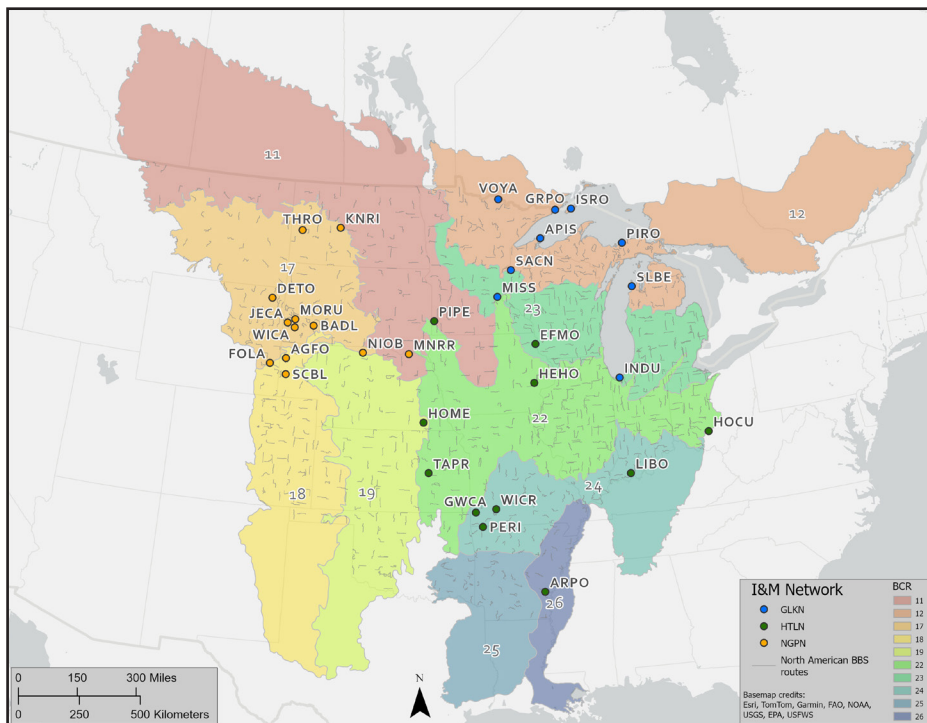
Are National Parks Good Bird Habitat?

The value of national parks as bird habitat depends not only on local conditions within the parks, but also on the matrix of habitats in which they are located. However, the influences of localized and broader landscape habitats on birds vary by species and have not been quantified. Similarly, the trends of land cover types through time have not been systematically quantified for Midwest Region national parks and the landscapes around them, despite evidence of ongoing habitat loss exacerbated by human population growth.

With this study, we wanted to determine if there was a difference between the prevalence of bird species of interest in parks and areas with similar land cover outside of parks. We also wanted to see if we could infer how the habitat available within and around park borders may affect any difference in bird populations.

The National Park Service's Midwest Region ([MWR](#)) encompasses 64 national park units across 13 states: North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Arkansas, Wisconsin, Illinois, Michigan, Indiana, and Ohio. The NPS's Inventory and Monitoring Division is comprised of 32 networks servicewide, three of which are in the MWR. Together these three networks conduct long-term monitoring in 37 of the MWR's 64 national park units: the [Great Lakes Network](#) (nine parks), [Heartland Network](#) (15 parks), and [Northern Great Plains Network](#) (13 parks). Two parks in the Northern Great Plains Network are in Wyoming, which is outside the Midwest Region.

Our first step was to gather bird monitoring data collected on North American Breeding Bird Survey



National park units in the Midwest Region's three inventory and monitoring networks: Great Lakes Network (GLKN; blue dots), Heartland Network (HTLN; green dots), and Northern Great Plains Network (NGPN; orange dots). Gray lines indicate North American Breeding Bird Survey (BBS) routes. Colored and numbered polygons indicate Bird Conservation Regions (BCRs). Four-letter codes on the map indicate park names. In the GLKN, those are APIS (Apostle Islands), GRPO (Grand Portage), INDU (Indiana Dunes), ISRO (Isle Royale), MISS (Mississippi National River), PIRO (Pictured Rocks), SACN (St. Croix Riverway), SLBE (Sleeping Bear Dunes), and VOYA (Voyageurs).

([BBS](#)) routes across the central United States. BBS data were used to predict occupancy of bird species of concern in 32 national park units across nine Bird Conservation Regions ([BCR](#)) in the Midwest based on land cover in and around those parks. We then compared the predictions with bird survey data collected in each national park unit to determine if bird species of concern were more or less prevalent in parks than expected.

Bird species of interest for each BCR were selected based on conservation priority status. A total of 45 species were chosen including grassland specialists such as Bobolink (*Dolichonyx oryzivorus*), Henslow's Sparrow (*Centronyx henslowii*), and Chestnut-collared Longspur (*Calcarius ornatus*), and forest specialists such as Cerulean Warbler (*Setophaga cerulea*), Black-throated Blue Warbler (*Setophaga caerulescens*),

Canada Warbler (*Cardellina canadensis*), and Canada Jay (*Perisoreus canadensis*).

Using data from the National Land Cover Database (NLCD), we examined land cover at three scales: within the park, 5 km around the park boundary, and 10 km around the park boundary. Land cover types were classified as agriculture, developed, forest, herbaceous, and wetlands. As expected, we found that over the entire region, statistically significant change in land cover occurred outside the parks more often than inside. Developed land showed the largest number of significant trends followed by agriculture, forest, herbaceous, and wetland classes. Landscape changes were most numerous in the Badlands and Prairies (BCR 17), where most of the Northern Great Plains Network parks are located, and in the *Boreal Hardwood Transition* (BCR 12), where most Great Lakes Network parks are located. Together, these two BCRs accounted for 48% of the significant changes.

Occupancy by bird species of concern in the Great Lakes Network’s BCR 12 parks was generally comparable to that found on BBS routes outside the parks (*Figure 1*). Landscapes around all these parks—and inside some of them—showed significant changes in the agricultural and developed classes. The only other noteworthy result was at Voyageurs, where wetlands increased significantly both inside and outside the park.

Two GLKN parks—Mississippi River and Indiana Dunes—and the southern half of the St. Croix Riverway are in the *Prairie Hardwood Transition* (BCR 23). Like the parks in the north, occupancy by bird species of concern in these parks also was comparable to that found on BBS routes outside the park (*Figure 2*). However, only two of the nine priority species were detected at Indiana Dunes (Wood Thrush and Red-headed Woodpecker). The parks in this BCR lie within a matrix of agricultural, developed, and forest land cover types, and all

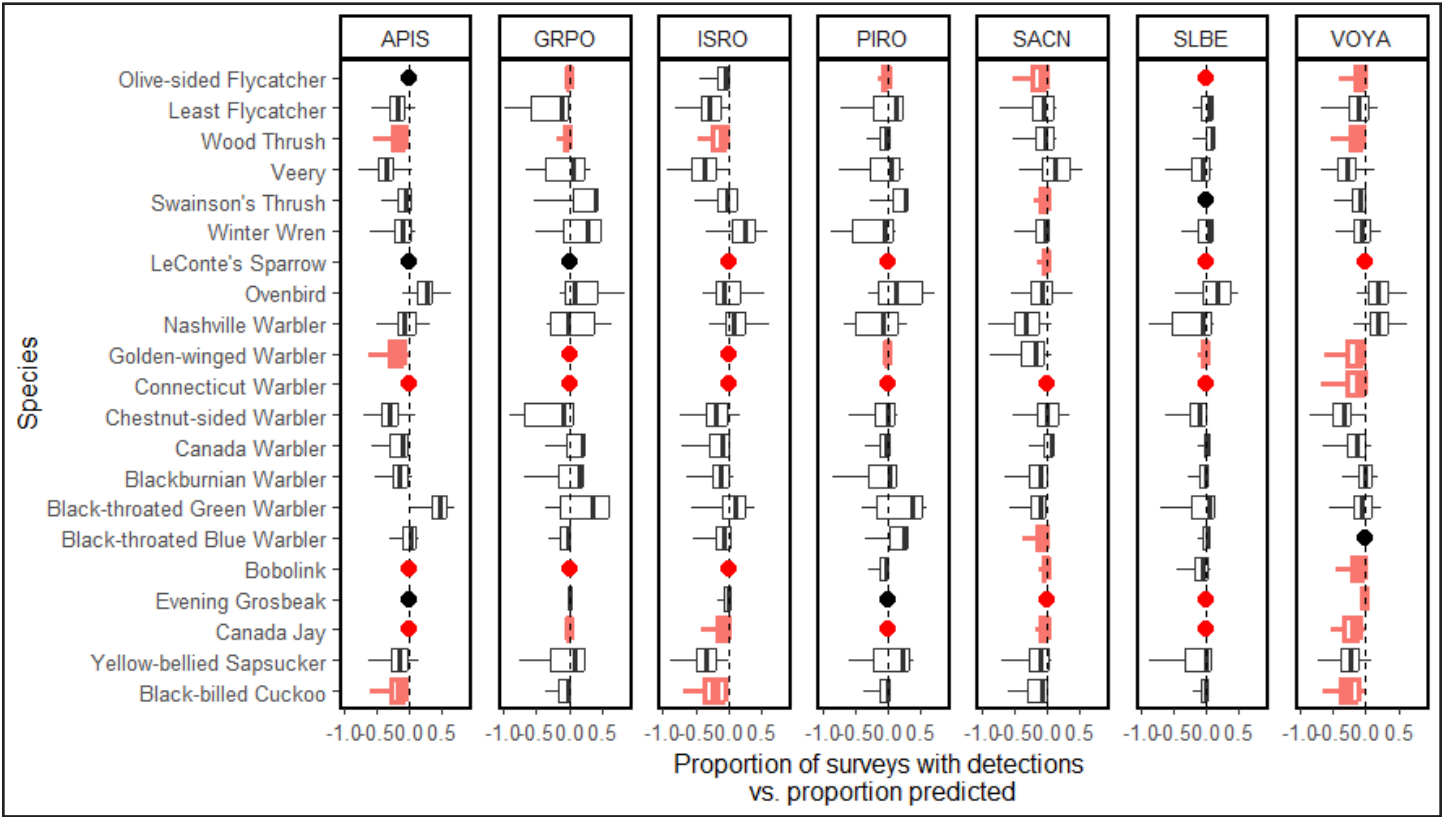


Figure 1. Proportion of predicted versus actual detections of bird species of concern at seven Great Lakes Network park units in Bird Conservation Region (BCR) 12: Apostle Islands National Lakeshore (APIS), Grand Portage National Monument (GRPO), Isle Royale National Park (ISRO), Pictured Rocks National Lakeshore (PIRO), the northern half of the Saint Croix National Scenic Riverway (SACN), Sleeping Bear Dunes National Lakeshore (SLBE), and Voyageurs National Park (VOYA). Dashed vertical line at the central 0 point on the x-axis represents no difference in occupancy inside vs. outside the parks. Boxplots are shown for species detected in, or whose breeding ranges include, these parks. Boxplots to the left of the line represent birds that are less frequently found in parks compared to outside of them, and boxplots to the right of the line indicate species that are more frequently found inside parks compared to outside. Red boxplots indicate species not detected in park surveys. Dots represent species for which the park is outside of their normal range but that were still detected during park surveys (black dot) or were absent from the park (red dot).

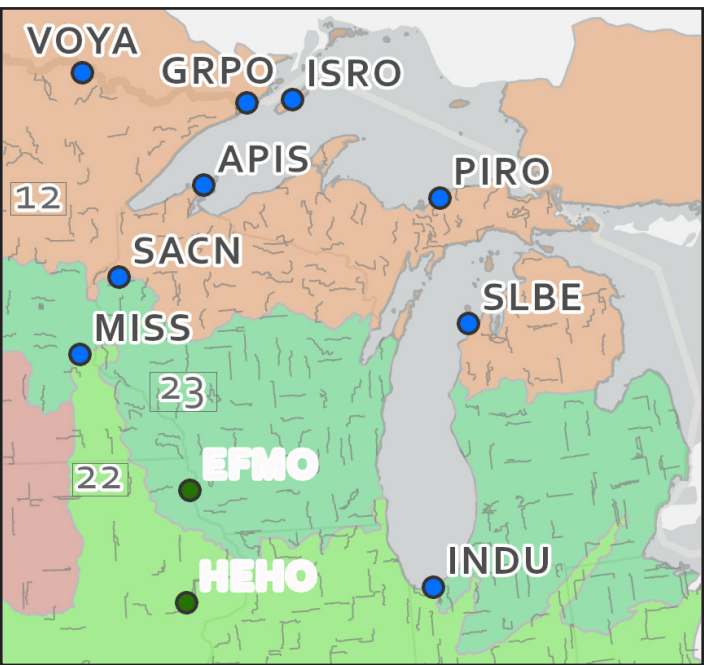
parks in this BCR experienced significant changes at varying scales in all three cover types.

Across all the parks in the three MWR networks, species of concern were, on average, less commonly detected in parks than outside of them.

In seven of the nine Great Lakes Network parks, 50% or more of the bird species of concern were detected inside and outside of parks in equal measure (Figure 3). At Indiana Dunes and Voyageurs, 66% and 60% of the species, respectively, were more frequently detected outside the parks than inside. Apostle Islands was the only park with a species of concern (Black-throated Green Warbler) that was detected inside the park at higher rates than outside the park.

What’s Around Parks Affects What’s In Them

Parks are considered to be islands of natural habitat surrounded by humanity, but land use around a park’s borders changes in ways that can gradually isolate the habitats within the parks. A study of two Great Lakes region national park units found that creating a national park helped to improve



Great Lakes Network parks occur in Bird Conservation Regions 12 and 23, but two parks—MISS and INDU—are also on the border of BCR 22 (Eastern Tallgrass Prairie). EFMO (Effigy Mounds National Monument) and HEHO (Herbert Hoover National Historic Site) are in the Heartland Network.

habitat within the park by reducing and stopping development, but the creation of more visitor amenities led to enhanced development around both parks. A separate study found that housing

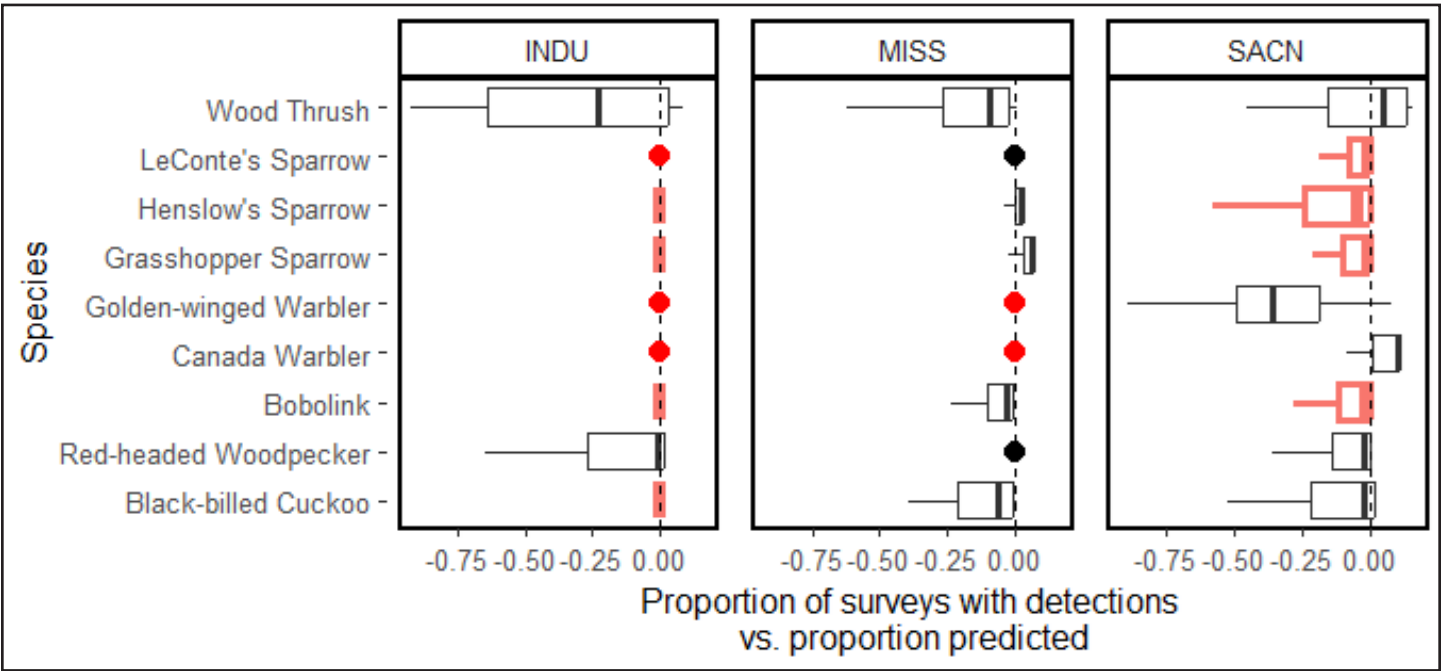


Figure 2. Proportion of predicted versus actual detections of bird species of concern at three Great Lakes Network parks in Bird Conservation Region (BCR) 23: Indiana Dunes National Park (INDU), Mississippi National River and Recreation Area (MISS), and the southern half of the St. Croix National Scenic Riverway (SACN). Dashed vertical line at the 0 point on the x-axis represents no difference in occupancy inside or outside the parks. Boxplots are shown for species detected in or whose breeding ranges include these parks. Boxplots to the left of the line represent birds that are less frequently found in parks compared to outside of them, and boxplots to the right of the line indicate species that are more frequently found inside parks compared to outside. Red boxplots indicate species not detected in park surveys. Dots represent species for which the park is outside of their normal range but were still detected during park surveys (black dot) or were absent from the park (red dot).

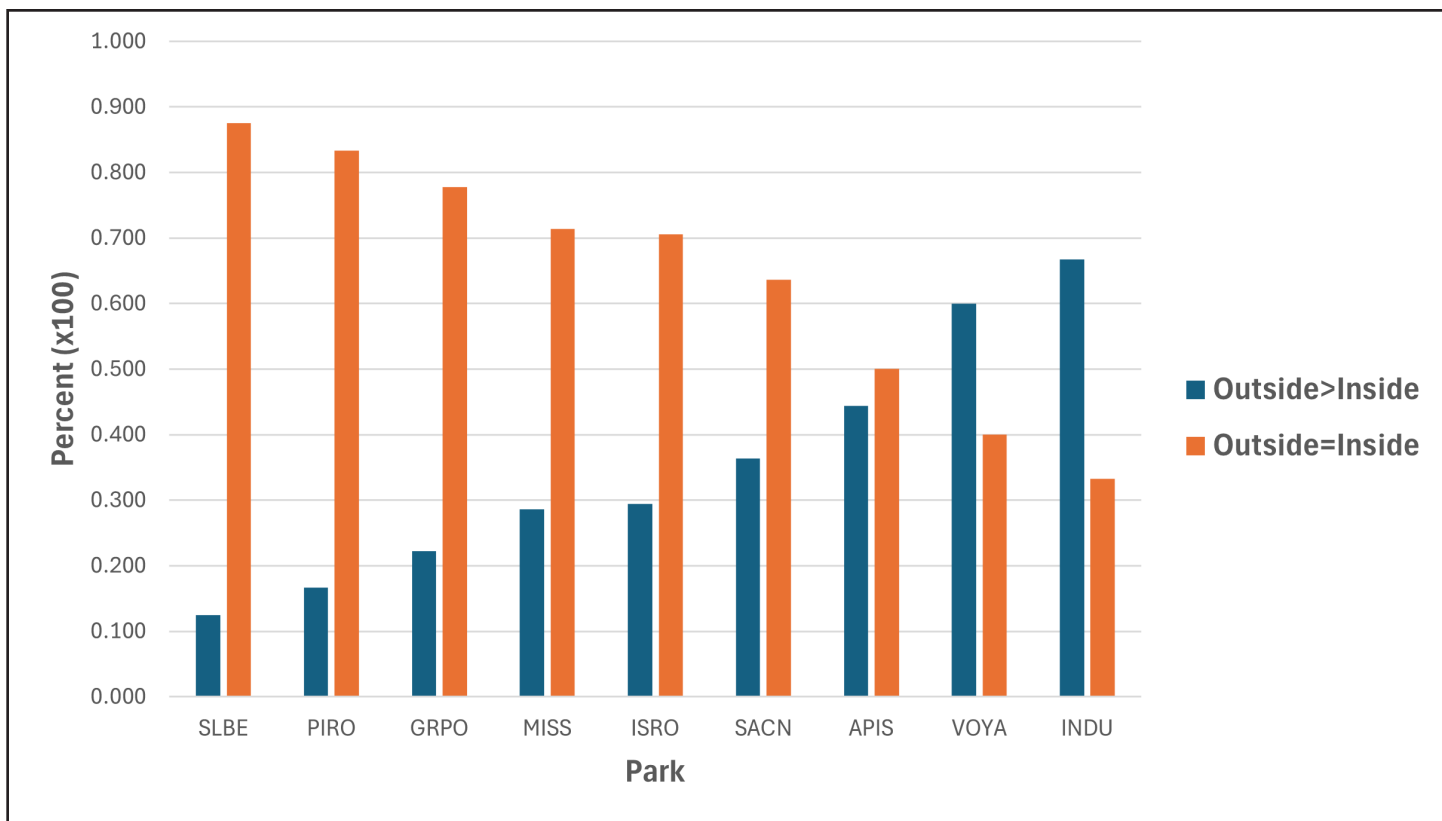


Figure 3. Proportion of bird species of concern, by park, occupying habitats outside parks more than inside parks (blue) or at equal levels (orange) (one-sided 95% confidence interval). Does not include out-of-range species. SLBE=Sleeping Bear Dunes, PIRO=Pictured Rocks, GRPO=Grand Portage, MISS=Mississippi River, ISRO=Isle Royale, SACN=St. Croix Riverway, APIS=Apostle Islands, VOYA=Voyageurs, INDU=Indiana Dunes.

density at the boundary of protected areas tended to have a strong negative influence on abundance and richness of bird species. We saw this in our analysis of land use around INDU and MISS, where development in the parks was less than outside, and forested lands were more common in the parks, but the trends show significantly increasing development in and around the parks and decreasing forested land. Still, a little more than 70% of bird species of concern at MISS occupied habitats inside and outside the park equally (*Figure*

3). Habitat outside of parks is important for breeding birds in the Midwest because the parks are relatively small and because they do not contain the best habitat for many species. Nonetheless, parks are important as islands of habitat in more developed landscapes and because targeted habitat improvement projects can be implemented in them, such as controlled burns to increase habitat quality.



This study was a collaborative project between the National Park Service and the U.S. Geological Survey with funding support from the USGS Natural Resource Preservation Program. A journal article was produced from an initial analysis to determine if the North American Breeding Bird Survey could be used to make predictions about bird populations in the parks. That can be found at:

Burner, R.C., A. Kirschbaum, J.A. Hostetler, D.J. Ziolkowski Jr., N.M. Anich, D. Turek, E.D. Striegel, and N.D. Niemuth. 2024. Informative priors can account for location uncertainty in stop-level analyses of the North American Breeding Bird Survey (BBS), allowing fine-scale ecological analyses. *Ornithological Applications* 126:1–17 (<https://doi.org/10.1093/ornithapp/duae041>).

The full report from this study can be found at:

Burner, R.C., A.A. Kirschbaum, T. Gostomski, and D.G. Peitz. 2025. US national park units as breeding bird habitat: A comparison of species prevalence and land cover across the midwestern and central United States. *Science Report NPS/SR—2025/317*. National Park Service, Fort Collins, Colorado (<https://doi.org/10.36967/2312602>).