

# Conservation of native migratory birds

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## **Collaborators:**

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## **Graduate Students:**

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## **Goals:**

To aid in the conservation and management of native migratory birds in North America by understanding their biology and habitat use, especially when affected habitat restoration, across diverse landscapes.

## **Recent Publications:**

Ruhl, P.J., E. Flaherty, and J. B. Dunning. 2019. Using stable isotopes of plasma, red blood cells, feces, and feathers to assess mature-forest bird diet during the post-fledging period. *Canadian Journal of Zoology*. *Canadian Journal of Zoology* 93:39-46.

Ruhl, P.J. C.D. Delancey, and J. B. Dunning. 2018. Roost preference, postfledging habitat use, and breeding phenology of adult female Worm-eating Warblers (*Helmitheros vermivorum*) on the breeding grounds. *Wilson Journal of Ornithology* 130:397-409.

Kellner, K., P. J. Ruhl, J. B. Dunning, K. W. Barnes, M. R. Saunders, and R. W. Swihart. 2018. Local-scale habitat components driving bird abundance in eastern deciduous forests. *American Midland Naturalist* 180:52-65.

## **Statement of Problem:**

For decades, we have been concerned about the health of native wildlife populations in North America, as human activities have reduced the amount and quality of natural habitats across the continent. These concerns have been highlighted by publications and analyses in recent years that show that bird populations continue to decline in spite of years of conservation work. In 2019, for instance, major analyses of avian population databases showed that current North American bird populations have declined by about 3 billion birds (30% loss) since 1970 and many species that are currently not of conservation concern may be threatened by climate change.

To take actions on these concerns we need good scientific knowledge about the basic biology and ecology of our native wildlife species. We also need rigorous scientific tests of proposed solutions to population declines and a scientific underpinning to our management plans for dealing with continued habitat loss, human-associated change in habitat quality (such as the effects of new and old pollutants) and climate change. My students and I conduct research to both increase our ecological knowledge regarding native birds and also to contribute to the development of scientifically sound conservation and management strategies.

## **Current Activities:**

Our research involves both field studies of poorly understood species and analysis of data from these field studies and other sources to suggest ways of countering the decline of Indiana birds. For example, from 2016-2018 we banded birds in recently harvested forest patches in southern Indiana as part of the Hardwood Ecosystem experiment. It had been previously documented that migratory birds that typically breed in mature forest habitat also use younger forests generated by disturbances such as timber harvest later in the breeding season. We studied the breeding biology of these species to determine the role that younger forest habitat plays in the annual cycle of these birds. Our results included new information on the roosting behavior of breeding females, the diet of a variety of mature-forest breeders while they are feeding fledglings (dependent young that have left the nest), and the habitats used by breeding birds at different spatial scales. Our results suggest that breeding birds of the Midwest benefit from having access to a mix of habitat types and forest ages, even those species are typically thought of as mature-forest specialists.

We are also making use of a unique source of data on bird migration to quantify the amount of bird migration (e.g., number of birds) in Indiana during recent decades and the habitats most important to these migrants. These studies examine patterns of bird migration detectable using Doppler weather radar, more normally associated with tracking weather fronts and rainfall. Examination of these radar images have documented a strong decline in migration activity between 2005 and 2017, paralleling similar declines seen in national analyses. We are also using the Indiana radars to show precisely which habitat patches appear to support the largest numbers of migrants in spring and fall. Older

Homoya, W., J. W. Moore, P. J. Ruhl, and J. B. Dunning. 2017. Do American Golden-Plovers (*Pluvialis dominica*) avoid wind-energy turbines in agricultural fields in Indiana during spring migration? *Wilson Journal of Ornithology* 129:863-871.

neighborhoods with higher income households appear to support a disproportionate number of migrants, suggesting that we can affect habitat quality for migrants with the choices that we make in landscaping and care of private property in cities and towns. The results also suggest that conservation of migrant birds is a social justice issue – poorer urban neighborhoods support fewer migrants meaning that the people living in those areas are less connected to the natural world that inspires so many people to work in conservation.

Undergraduate students working in our laboratory have also conducted research that is useful in managing our native wildlife. A declining shorebird, the American Golden-Plover, stops by in the spring to spend several weeks feeding in row-crop agricultural fields such as in Benton County IN, before finishing their migration to Arctic breeding grounds. These fields are also where wind turbines have been constructed, worrying some conservationists that the plovers might be adversely affected by construction of wind farms in the plovers' preferred stopover habitat. A study by two FNR Wildlife majors showed only a limited amount of evidence that the plovers avoided wind turbines while foraging and no evidence of direct mortality, cautiously suggesting that this form of renewable energy may be compatible with the conservation of this migratory shorebird. Another team of undergraduates is banding Northern Saw-whet Owls on Purdue properties in western Tippecanoe County, aiding a continental effort to better understand this poorly researched migratory species.

Most recently we are initiating projects to examine how native endangered species in Hawaii are responding to forest restoration efforts and to develop plans for species reintroductions here in Indiana for species absent or endangered in the state, such as the Greater Prairie-Chicken.