



STATE WILDLIFE GRANT—INDIANA

Identifying Habitat Associations and Management Impacts for Critical Marshbirds of Indiana



American coots feed in an emergent wetland marsh at Wolf Lake in Hammond. (Photo by Libby Keyes)

CURRENT STATUS

First year of a three-year project

FUNDING SOURCES AND PARTNERS

State Wildlife Grant Program (T7R26)
Audubon Great Lakes
Indiana Audubon Society
Indiana University Northwest

PROJECT PERSONNEL

Stephanie Beilke, Principal Investigator, Audubon Great Lakes
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BACKGROUND AND OBJECTIVES

Six secretive marshbird species that breed in Indiana are designated as respective Species of Greatest Conservation Need (SGCN) and listed as endangered

in the Indiana State Wildlife Action Plan (SWAP). These species are the American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), black rail (*Laterallus jamaicensis*), king rail (*Rallus elegans*), Virginia rail (*R. limicola*), and common gallinule (*Gallinula galeata*).

These species are, in general, experiencing declines throughout North America due to the rapid loss of suitable wetland habitat. In addition, little is known about their habitat requirements and the effects of management activities on their populations. Therefore, a rigorous investigation of marshbird abundance and habitat associations throughout Indiana is warranted.

The objective of this project is to identify habitat and landscape characteristics (e.g., interspersed, percent of invasive species, water depth) that significantly affect the presence and occupancy of secretive marshbirds in Indiana. This project aims to inform best management practices, so that suitable habitat can be created, and land managers have the tools to manage for these



An immature black-crowned night-heron hunts for prey along the shoreline at Wolf Lake in Hammond. (Photo by Libby Keyes)



Several marshbird survey points were accessed by kayak. Surveys took place in the morning and were led by a team of volunteers and partners. (Photo by Dr. Peter Avis)



Fourteen points were surveyed at Tern Bar Slough Wildlife Diversity Area. This is a Virginia rail found during the first survey period of 2018. (Photo by Evan Speck)

species over the long-term. This project also will form the foundation to a more comprehensive monitoring program that will inform statewide population trends of secretive marshbird species.

METHODS

Marshbird surveys were conducted along routes at eight designated wetland complexes across Indiana. Survey routes were visited three times, with visits placed at least 10 days apart. Visits occurred during two-week periods between mid-April and mid-June. Start dates were dictated by the designated regional survey window (e.g., northern site visits began on May 1, whereas visits to southern sites

began on April 15). Survey design was adapted from the North American marshbird monitoring protocol by the U.S. Fish & Wildlife Service. Each survey consisted of five minutes of passive listening followed by six minutes of audio broadcasts of six target species vocalizations. These species were the king rail, least bittern, sora (*Porzana carolina*), Virginia rail, common gallinule, and pied-billed grebe (*Podilymbus podiceps*). Target species not included in the broadcast were the American bittern and black rail.

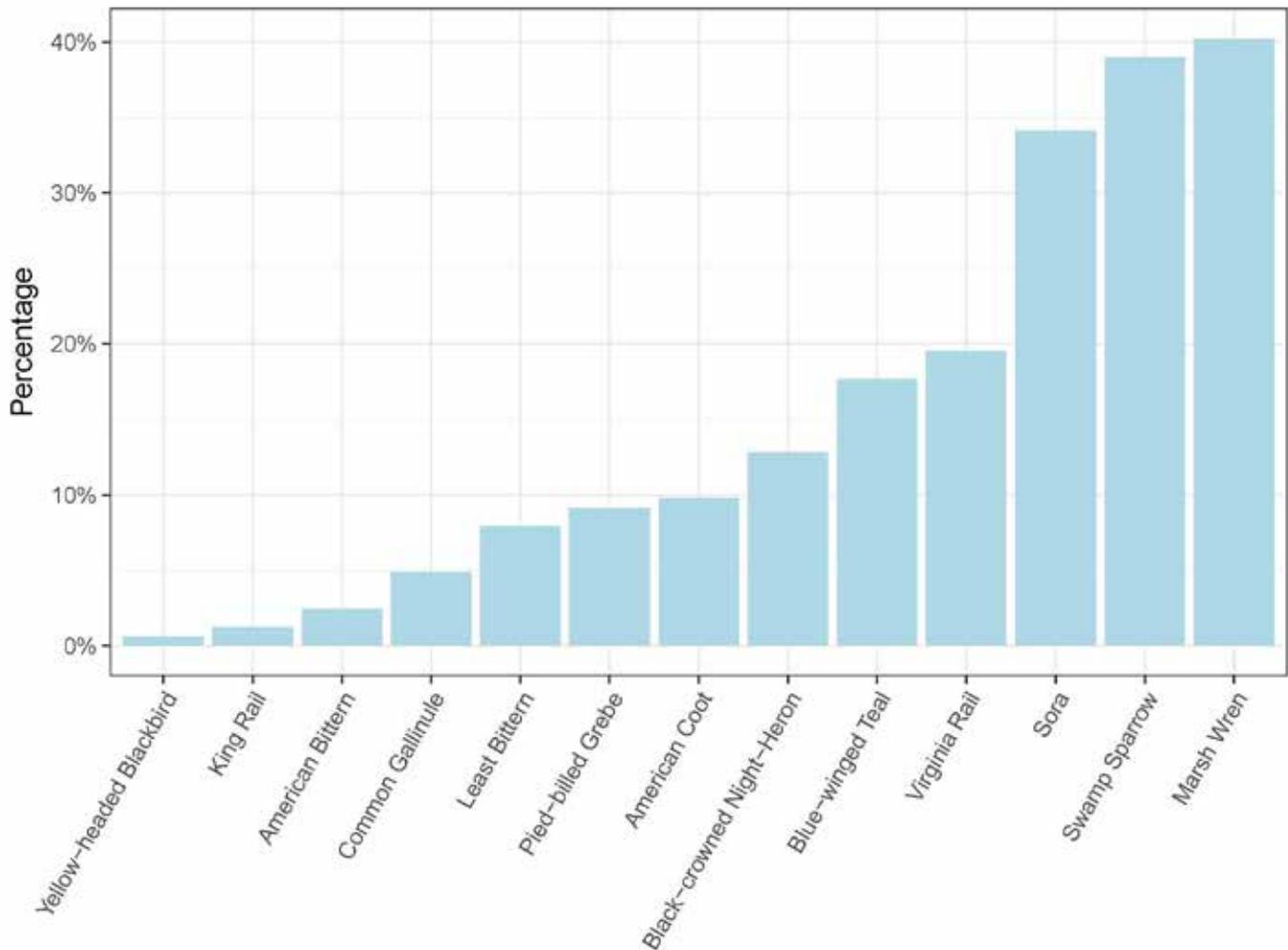
Surveyors recorded detections (seen or heard) of all eight target species during the 11-minute count period. Secondary focal species were voluntarily recorded and included American coot (*Fulica americana*), black-crowned night-heron (*Nycticorax nycticorax*), black tern (*Cblidonias niger*), blue-winged teal (*Spatula discors*), little blue heron (*Egretta caerulea*), marsh wren (*Cistothorus palustris*), snowy egret (*E. thula*), swamp sparrow (*Melospiza georgiana*), yellow-crowned night-heron (*Nyctanassa violacea*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Habitat data collection included on-the-ground habitat surveys, drone surveys and water-level recordings at designated survey points. On-the-ground habitat surveys were conducted in June and July to measure the percent cover of dominant vegetation types and percent cover of open water within 100 meters of each survey point. Drone imagery surveys occurred in May and June at select survey points. Water depth data were collected by marshbird monitors at gauges that were installed in open water at wetland sites.

PROGRESS TO DATE

Northern Indiana

In 2018, a total of 164 points were surveyed on 24 routes. Wetlands were monitored at the following state



Percentage of 164 survey points that were occupied by focal marshbird species. Thirteen of 18 focal species were detected during surveys. Marsh wrens occupied the highest percentage of points, followed by swamp sparrows and sora.

properties and Indiana Dedicated Nature Preserves (a category that includes properties with mixed land-ownership): Clark and Pine Nature Preserve, DuPont Natural Area, Gibson Woods, Tolleston Ridges, Grand Calumet Tern Site/Seidner Dune and Swale, Indiana Dunes State Park, Ivanhoe Dune and Swale, Pine Station Nature Preserve, Roxana Marsh, and Willow Slough Fish & Wildlife Area (FWA). Monitoring was also conducted at Indiana Dunes National Lakeshore (National Park Service), Beemsterboer (private property managed by The Nature Conservancy), Highland Heron Rookery, Kankakee Sands (The Nature Conservancy), and wetlands along the Little Calumet River (Little Calumet River Basin Development Commission).

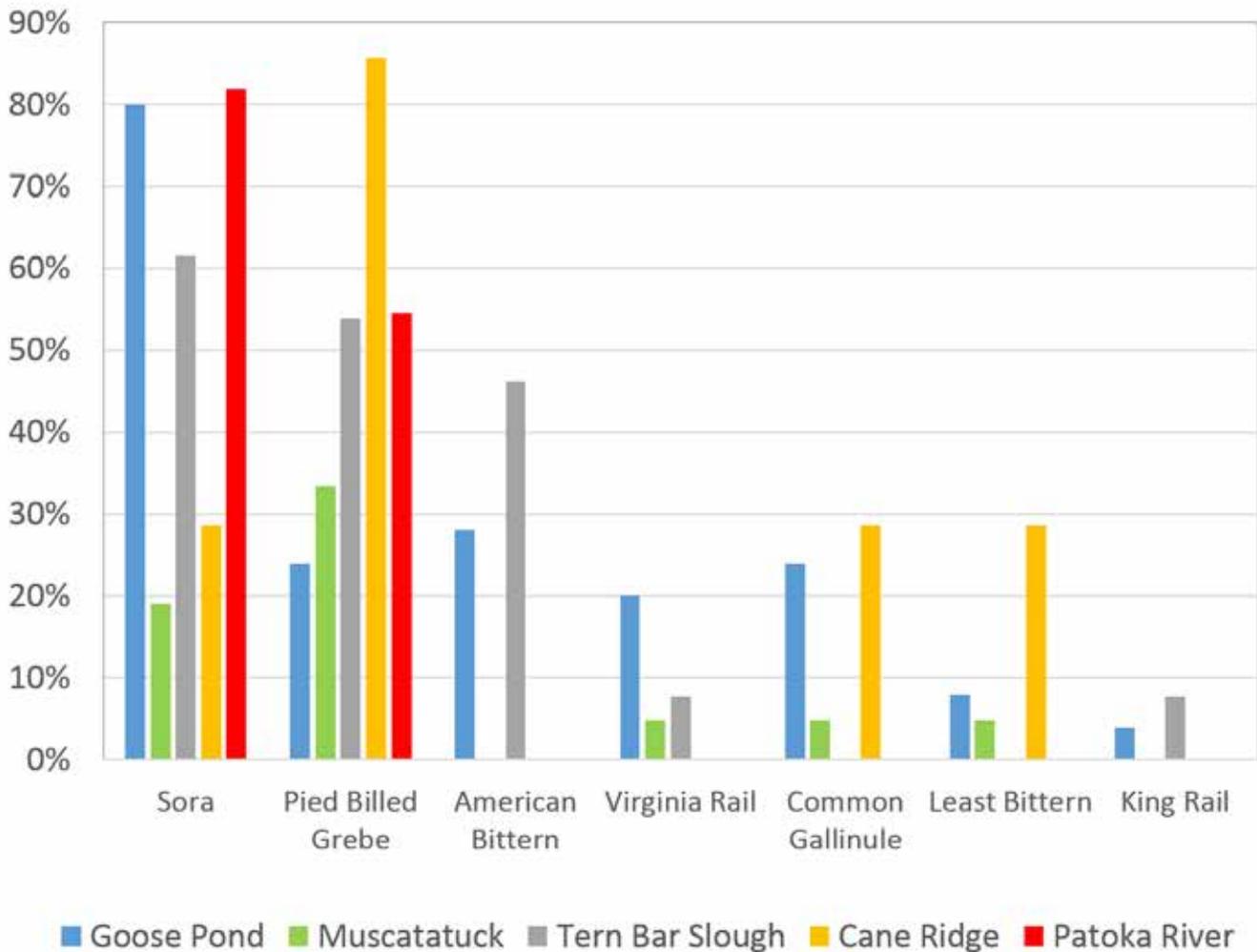
Thirteen of 18 (72%) focal species were detected, including all six for which audio broadcasts were used. Species detected were American bittern, American coot, black-crowned night-heron, blue-winged teal, common gallinule, king rail, least bittern, marsh wren, pied-billed grebe, sora, swamp sparrow, Virginia rail, and yellow-headed blackbird.

Drone imagery was collected at Indiana Dunes State Park. Habitat surveys were conducted at Tolleston Ridges, Pine Station Nature Preserve, and three wetland sites along the Little Calumet River (Chase Street Marsh, Grant Street Marsh, and MLK Drive Wetland). Water depth was recorded at 14 water gauges.

In 2019, marshbird surveys will be repeated at the same routes that were surveyed in 2018. Drone imagery and habitat surveys will be expanded to include all or most wetland sites at which landowner permission has been granted. We are making progress on classifying drone imagery and will have classification methods refined in time to process the latest imagery starting in the summer of 2019.

Southern Indiana

Goose Pond FWA, Muscatatuck National Wildlife Refuge (NWR), Patoka River NWR, Cane Ridge Wildlife Management Area (WMA), and Tern Bar Slough Wildlife Diversity Area (WDA) hosted 26 marshbird routes in southern Indiana. Only 25 routes consisting of 77



Occupancy of target marshbird species at five sites in southern Indiana.

points were surveyed in 2018. A total of 264 unique detections was recorded of target species. Soras were the most numerous, with 133 detections, whereas king rails were the least numerous among species that were detected, with two. No black rails were observed.

Because the number of survey points varied among sites (e.g., Goose Pond FWA had 26 points, whereas Tern Bar Slough WDA had 14), species presence was evaluated using occupancy rather than the number of detections to avoid biases associated with number of survey points. Occupancy is the likelihood that a site hosted at least one individual of the target species. This can be determined by dividing the number of survey points that hosted a particular species by the total number of points surveyed at the site. For example, if at least one sora was observed at seven of 14 total survey points at Tern Bar Slough WDA, then occupancy for sora would be 50%. In other words, the likelihood of observing a sora at Tern Bar Slough WDA would be 50%.

Sora occupancy was highest at Patoka River NWR (82%) and lowest at Muscatatuck NWR (19%). Pied-billed grebe occupancy was highest at Cane Ridge WMA

(86%) and lowest at Goose Pond FWA (24%). American bittern occupancy was highest at Tern Bar Slough WDA (46%) but the species was not detected at Muscatatuck NWR, Cane Ridge WDA, or Patoka River NWR. Virginia rail occupancy was highest at Goose Pond FWA (20%) but it was not detected at Cane Ridge WMA or Patoka River NWR. Common gallinule and least bittern occupancy was highest at Cane Ridge WMA (29% for both species) but it was not detected at Tern Bar Slough WDA or Patoka River NWR. Last, king rail occupancy was highest at Tern Bar Slough WDA (8%) but the species was not detected at Muscatatuck NWR, Cane Ridge WMA, and Patoka River NWR. The absence of detections of American bittern, least bittern, black rail, king rail, Virginia rail, and common gallinule at at least two sites is not surprising. Rather, it is consistent, given the status of each as a state-endangered species.

Drone imagery was collected at Goose Pond FWA. Habitat surveys were not conducted in 2018, and water depth was not recorded because gauges were not yet deployed. The first year of the project was designated as a pilot year due to several challenges that were encountered, such as staffing losses.

In 2019, marshbird surveys will be repeated at the same routes that were surveyed in 2018. Drone imagery, water gauge monitoring, and habitat surveys will be expanded to include all or most wetland sites at which landowner permission has been granted. We are making progress on classifying drone imagery and will have classification methods refined in time to process the latest imagery beginning summer 2019.

COST: \$406,284 FOR THE COMPLETE THREE-YEAR PROJECT