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**TITLE: American Woodcock Nesting**

American woodcock (*Scolopax minor*) breeding populations have been undergoing a long-term decline since 1968 (Cooper and Rau 2012). Existing habitat models for breeding woodcock may fail to capture important processes underlying declines in reproductive rates. Better understanding the relation between habitat/landscape attributes and reproductive success would assist managers in targeting habitat treatments to improve woodcock reproductive success. During 2018, the following work by objective was conducted towards achieving the study outcomes:

Objective 1. Reproductive success - Estimate nesting density, nesting success and fledgling survival for woodcock in 2 distinct Michigan landscapes over a 3-year period.

During the 2018 field season (late March to late July) we located 27 different nests. Of these, 17 were monitored with cameras. We placed transmitters on 5 hens and 29 chicks. All hens went missing soon after being marked due to failed nests or broods and were not monitored further. The chicks were monitored until they died, moved out of range, or the transmitter stopped working. Most field work occurred in Roscommon County, particularly when tracking chicks, with additional work in Wexford, Missaukee, Clinton, Oakland, and Clare counties. We will use location and survival information from 2018 in conjunction with survival data from the 2017 field season to estimate nest and chick survival.

Objective 2. Predator identification - Identify predators responsible for predation of woodcock nests and young.

Of the 17 nests that we monitored with cameras, we observed 3 occasions of raccoon predation and 1 occasion of weasel predation. We also observed the presence of coyotes and deer near nests, but no direct evidence of predation by these species. One nest was abandoned presumably due to high human activity in the area, and 2 were abandoned for unknown causes. Two nests with cameras failed, but the camera showed no evidence to confirm or disprove predation. In addition to the 17 nests monitored with cameras, we found 10 nests after they had already either hatched or been destroyed, which we determined by the shape and condition of the empty shells. Of the 27 total nests monitored, 11 were predated or failed for other reasons.

15 nests successfully hatched at least 1 chick, and 1 nest had an unknown fate. One nest in a highly-trafficked deer area was later abandoned, possibly due to high activity by other animals.

One of the transmitter-marked hens had a brood of 3 chicks that were all found dead of apparent weasel predation before they were of appropriate size to be marked with transmitters. Of the 29 chicks that were marked with transmitters, 8 were confirmed dead before the end of the field season. We confirmed that 4 of these chicks died of mammal predation but had insufficient information to determine the cause of death for the remaining 4 chicks. We did not necropsy chicks during this field season because few mortalities provided enough remains to allow for an investigation. Instead, we relied on the condition and puncture patterns of the remains of predated birds to decipher mammalian or avian predation.

Objective 3. Linking reproductive rates to habitat - Link woodcock reproductive rates to vegetative and physical characteristics near nest sites and surrounding landscapes.

We measured habitat variables around 27 nest sites. These variables included ground and canopy cover, vegetation type, stem density, DBH measurements of trees to later calculate basal area, and distance of the nest to the nearest tree or clearing. In addition to these measurements, we performed the same measurements on random sites that were selected within a 200-meter radius of the nest location, in a random direction and distance from the nest. This paired design will enable comparison of sites that were used by the study animals and sites that were available in the bird's home range but not used. We will perform a use-availability analysis to assess differences between these sites.

The 29 marked chicks belonged to 19 different broods. We performed the same local habitat measurements on brood sites that we did on nesting sites and paired each of them to a random site. For each brood, we performed 3 different vegetation surveys: one in the 0—2-week age range before chicks were able to fly, one in the 2—4-week age range when chicks could fly but were still with their broods, and one when the chicks were 4+ weeks old and had left their broods. Of the 19 broods, we were able to perform all 3 vegetation surveys on 9 of them. We performed 2 vegetation surveys on 11 broods, and at least 1 vegetation survey on 16 broods. We were unable to perform vegetation surveys on 3 broods because chicks either died immediately after marking or were unable to be relocated.

Due to staffing changes and an increased focus on local habitat characteristics instead of landscape characteristics, we did not prioritize investigating woodcock reproductive rates in relation to the surrounding landscape.

Objective 4. Management recommendations - Make recommendations on landscape-dependent habitat management practices that efficiently target improvement in woodcock reproductive rates.

Graduate student, Ashley Huinker, presented preliminary findings in a talk titled “Microhabitat selection and reproductive success of American woodcock in Michigan” at the annual Great Lakes Waterfowl/Migratory Bird Partners’ Meeting, Winous Point Marsh Conservancy, Port Clinton, Ohio.

Partners: Safari Club International-MIC, Michigan State University.

Time Line and Budget: This project started in 2016 and is scheduled to run through 2020. Total project cost is \$490,000. No additional SCI-MIC funds are requested for this project in FY2019.