

Department of Natural Resources

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2016 Progress Reports

Mute Swan Research

Mute swans are not native to North America and distribution and abundance of this invasive species has increased significantly throughout the lower Great Lakes since their introduction in the mid-twentieth century. There is much concern about negative impacts of mute swans on native waterfowl, water birds, submerged aquatic vegetation, and wetland habitats. Discussions with other government agencies and partners has resulted in a short-term goal of population stabilization and long-term population goal of no more than 2,000 mute swans in Michigan by 2030.

Recent efforts to control mute swan population growth in Michigan were guided by a model predicting population response to natural and management-induced mortality. This model was based on available literature and mute swan models developed for other regions with the primary management alternatives being lethal take of different age classes or reproductive classes and nest/egg destruction. There is considerable uncertainty about reproductive parameter estimates, the subadult life cycle of mute swans, and the potential for age-varying breeding propensity in relation to breeding densities. Inaccurate estimates of vital rates can translate into unrealistic predictions about take of adult mute swans or levels of nest destruction required to meet objectives and this could result in delayed achievement of population goals, causing prolonged impacts to natural resources. Similarly, management efficiency may be compromised by a poorly parameterized model and as mute swan numbers are reduced, it will be increasingly important to efficiently target cohorts that are contributing to reoccupation of breeding sites.

From 19 April – 28 September 2016, forty-nine mute swans were captured. Twenty-one breeding females were fitted with green plastic neck collars that included a GPS satellite transmitter. Six adult males (mates of breeding females) were also fitted with aluminum leg bands and green plastic neck collars. Twenty-two cygnets were also captured and fit with a green plastic neck collar and GPS transmitters. Over 150,000 usable GPS locations have been recorded for adult females and cygnets as of 30 September 2016, with no known mortalities detected. Fifty-six citizen reports of 22 individual neck collared swans have also been obtained as of 30 September 2016.

Aerial surveys were flown from April 12 -14 2016 to determine nesting density and 108 nests were detected on 8 study sites in southern Michigan. Surveys of nesting density were also recorded via 2 wing strut-mounted high-definition video cameras to confirm physical location of detected nests. Boats were then used to visit nests to ascertain clutch size, measure eggs, determine nest age, and place temperature-logging iButtons to monitor nest survival. Of nests observed with eggs present, 82.4 % hatched ≥ 1 egg resulting in an overall egg hatching rate of 76.8 %. Nest survival was 88% for 30 nests known to be incubated using a 47-day nesting interval (19 April – 4 June 2016). Mean

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clutch size for nests with completed clutches was 7.2 eggs per clutch. Initial observed brood size for successful nests resighted post-hatching was 5.0 cygnets/pair. Additional aerial surveys of site productivity (i.e., the number of cygnets present at fledging) were performed 29 August 2016. Sites were also surveyed for productivity by using boats (17 August – 6 September). Results from boat and aerial surveys were used to calculate a ratio of the number of fledged cygnets to the number of active nests per site.

MSU graduate student, Randy Knapik, updated Michigan DNR personnel of research progress at the Wildlife Division's southeast staff meeting on 24 May in Holly, MI. He also gave a field tour of the Pontiac Lake SRA study site and discussed the mute swan research with Ms. Jessica Piispanen (Region 3 USFWS – Wildlife and Sport Fish Restoration Coordinator) and Dr. Christine Hanaburgh (Michigan DNR – Federal Aid Coordinator) on 26 May. Randy also gave a research talk titled, "Mute Swans in Michigan: Using 21st Century Technology to Solve Centuries-old Problem" at the annual meeting of Michigan DNR Wildlife Division staff in Roscommon, MI, on 16 August.

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

Time Line and Budget: This project was initiated in the fall of 2014 and is scheduled to continue through 2018. Total project costs will exceed \$487,000 (including approximately \$170,000 in matching funds from Michigan State University).