

THE BREEDING ECOLOGY OF THE TRUMPETER SWAN
(OLOR BUCCINATOR RICAHRDSON) IN YELLOWSTONE NATIONAL PARK

Ruth E. Shea
Montana Cooperative Wildlife Research Unit
University of Montana

This report summarizes the first of two field seasons investigating habitat selection, productivity, and human disturbance of Trumpeter Swans nesting in and near Yellowstone National Park (YNP). The study is supported by the Montana Cooperative Wildlife Research Unit, the National Park Service, the National Wildlife Federation, the Northern Rocky Mountain Cooperative Park Study Project, the Trumpeter Swan Society, and the Wildlife Management Institute. I wish to thank the personnel of the Biologist's Office, YNP, and of the Montana Cooperative Wildlife Research Unit for their vital assistance on numerous occasions.

Study Objectives

- A. Determine the number of nesting pairs, the chronology and rates of nest desertion, nest failure, and cygnet mortality.
- B. Evaluate human activity in the vicinity of nesting sites.
- C. Quantify the incubation behavior of swans which are exposed to different levels of human activity.
- D. Examine environmental parameters for correlation with nesting success.
- E. Make management recommendations to minimize adverse human impacts on swan nesting success.

Methods

Ground searches and observations of nests from natural blinds were supplemented by 10 aerial surveys in order to locate all active nests and to closely follow the progress of each nesting attempt. Unhatched eggs and dead cygnets were collected in YNP and analyzed at the U.S. Fish and Wildlife Health Laboratory, Madison, Wisconsin.

Using time lapse photography, I filmed the incubation behavior of swans at five nests to determine the constancy of incubation.

Data on rates of human use, history of swan use, water chemistry, and physical characteristics of nesting lakes were gathered from Park files and direct observations.

Results and Discussion

Twenty active nests, the greatest number recorded in over 40 years of observations, were located in, or within 5 miles of, Yellowstone National Park. However, the aerial surveys of past years were made in late August and nests which failed early in the season would have been overlooked.

Most successful nests hatched between 15 and 25 June 1977; six failed prior to that time. Deep snow prevented human access to the nesting lakes until after those failures. Direct human disruption of incubation did not occur in 1977.

Of the 17 eggs collected intact, seven were infertile and four contained partially developed dead embryos. The remaining six eggs are undergoing pesticide analysis at the Patuxent Wildlife Research Center. The eggs were analyzed for bacterial and viral contamination, but no pathogenic organisms were found.

The initial examination of the time-lapse films revealed that the incubating swans spent a much greater period of time off the eggs than the one-half hour per day mentioned by Scott (1972). Some eggs which hatched later were left unattended more than 30 percent of the daylight hours.

The number of cygnets hatched in YNP was not determined in previous years, but the number of fledglings averaged 13.4 per year from 1950 to 1959 and 5.5 per year from 1960 to 1974. The 1977 hatch of 52 cygnets (2.6 cygnets per active nest) was unexpectedly high, based on the poor fledgling production of recent years. The rate of hatching in YNP equaled that achieved in the prime habitat of Red Rock Lakes National Wildlife Refuge (RRLNWR) where 69 cygnets hatched from 27 nests (2.6 cygnets per active nest) in 1977 (G. Stroops, personal communication).

While 39 (56.5%) of the cygnets at RRLNWR survived until September, only 13 (25%) of those from Yellowstone survived. High mortality during the first 6 weeks of life resulted in the death of entire broods. Five dead cygnets were collected but laboratory analysis did not determine the cause of death. Predation was not evident; cygnets were either dead in the nests or floating nearby.

Although the direct causes of the high cygnet mortality remain undetermined, several incidents of human disturbance were observed after the eggs hatched. At one nest, human activity caused the family to march overland to another pond and the brood was lost shortly after the forced move.

Recommendations and Conclusions

Despite high levels of human visitation, YNP compares favorably with RRLNWR in its nesting potential for Trumpeters. However, unexplained high cygnet mortality rates greatly reduce the realized productivity in YNP. A

determination should be made for Park managers whether this mortality is natural or induced by some human activity which could be altered through management.

Efforts in 1978 will be similar to those of 1977, but will be intensified during the first 6 weeks after the hatch. To determine the causes of cygnet mortality, cygnets exhibiting abnormal symptoms will be watched closely and collected before death, if possible. Extremely fresh specimens should make the laboratory analysis more productive.

Most clutches hatch before the nesting lakes are accessible to humans, so direct disturbance during incubation is negligible except at a few roadside lakes. Human activity later in the summer may interfere with proper care of the cygnets. Increasing levels of human use may cause swans to abandon lakes which once provided successful nesting sites.

Specific recommendations will be made at the conclusion of the 1978 nesting season.

Literature Cited

Scott, P. 1972. The Swans. Houghton Mifflin Company, Boston, 242 p.

Acknowledgments

Supported by: Montana Cooperative Wildlife Research Unit
National Park Service
National Wildlife Federation
Northern Rocky Mountain Cooperative Park Study Project
Trumpeter Swan Society
Wildlife Management Institute