



Production and habitat use by Canada geese at Freezout Lake, Montana
by Daniel Lee Hook

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE in Fish and Wildlife Management
Montana State University
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Abstract:

The production and use of nesting and brood habitat by Canada geese was studied from 1971 to 1972 at the Freezout Lake Management Area in northcentral Montana. Nesting increased 21.8 percent from 55 nests in 1971 to 67 nests in 1972. This accompanied a 10.7 percent increase in the total spring population and a longer nesting season. Average nest success for the two years was 70.5 percent with nest predation primarily by racoons which accounted for 22.9 percent of nest loss. The average successful nest produced 5.44 goslings. Total production increased 12.7 percent from 1971 to 1972 (189-213). Two (33.3 percent) of the six neck-collared two-year-old females nested in 1971. Islands were the preferred nesting type with 54 (98.2 percent) and 59 (88.1 percent) of the nests being located on islands in 1971 and 1972, respectively. The decrease in relative use of islands as nest sites in 1972 occurred when only 48 percent of the available islands were utilized. In an effort to assess the effect of nest predation on island use and nest success, island vegetation, distance from shore, and water depth were studied. No significant differences were found in the vegetation of 17 islands used versus 15 islands not used as nest sites in Pond 4. 1972 nest site vegetation showed that residual vegetation provided the only effective cover for the early nesting geese. Analysis of the data on distance from shore and depth of water between the islands and the shore showed selection by the geese for islands 200 feet or more from the shore and for those in water greater than 10 inches in depth. It was also shown that nests on islands in water less than 100-200 feet offshore and those on islands in water less than 10 inches in depth were more likely to be destroyed. Islands which received repeated use in 1971 and 1972 experienced 80.3 percent nest success as opposed to those nested on only once which had 52.6 percent success. With fairly stable production from 1970 to 1972, it was suggested that a limited number of secure nesting islands in combination with nest predation was having a dampening effect on population growth. Three major brood areas were delineated on the main lake. The vegetation of these areas was cover mapped.

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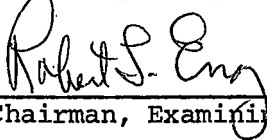
in

Fish and Wildlife Management

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ABSTRACT

The production and use of nesting and brood habitat by Canada geese was studied from 1971 to 1972 at the Freezout Lake Management Area in northcentral Montana. Nesting increased 21.8 percent from 55 nests in 1971 to 67 nests in 1972. This accompanied a 10.7 percent increase in the total spring population and a longer nesting season. Average nest success for the two years was 70.5 percent with nest predation primarily by raccoons which accounted for 22.9 percent of nest loss. The average successful nest produced 5.44 goslings. Total production increased 12.7 percent from 1971 to 1972 (189-213). Two (33.3 percent) of the six neck-collared two-year-old females nested in 1971. Islands were the preferred nesting type with 54 (98.2 percent) and 59 (88.1 percent) of the nests being located on islands in 1971 and 1972, respectively. The decrease in relative use of islands as nest sites in 1972 occurred when only 48 percent of the available islands were utilized. In an effort to assess the effect of nest predation on island use and nest success, island vegetation, distance from shore, and water depth were studied. No significant differences were found in the vegetation of 17 islands used versus 15 islands not used as nest sites in Pond 4. 1972 nest site vegetation showed that residual vegetation provided the only effective cover for the early nesting geese. Analysis of the data on distance from shore and depth of water between the islands and the shore showed selection by the geese for islands 200 feet or more from the shore and for those in water greater than 10 inches in depth. It was also shown that nests on islands in water less than 100-200 feet offshore and those on islands in water less than 10 inches in depth were more likely to be destroyed. Islands which received repeated use in 1971 and 1972 experienced 80.3 percent nest success as opposed to those nested on only once which had 52.6 percent success. With fairly stable production from 1970 to 1972, it was suggested that a limited number of secure nesting islands in combination with nest predation was having a dampening effect on population growth. Three major brood areas were delineated on the main lake. The vegetation of these areas was cover mapped.

INTRODUCTION

Several studies have shown preference by the Great Basin Canada goose (*Branta canadensis moffiti*) for islands as nest sites (Miller and Collins, 1953; Naylor, 1953; Geis, 1956; Craighead and Craighead, 1949). Construction of islands to encourage nesting can be a useful management practice.

At the Freezout Lake Management Area the opportunity existed to study a breeding population of Canada geese in man-made nesting habitat. From 1956 to 1969 a captive goose flock was maintained on the area. Releases of three-year-old Canada geese from this flock and additional releases of goslings from the Warm Springs State Game Farm provided the basis for the now free-flying goose flock. Objectives of the study were to determine the status and nesting success of the breeding population and to evaluate its nesting and brood habitat preference.

The field portion of the study was conducted on a part-time basis from April to June 1971, and on a full-time basis from June through August 1971, and March through August 1972.

DESCRIPTION OF THE STUDY AREA

Freezout Lake Management Area is a state waterfowl area approximately two miles northwest of Fairfield, Montana. The main lake and associated ponds lie in a glacial lake bed surrounded by rolling uplands on the western edge of the Fairfield Bench. Ellig (1955) gives a description of the area and relates some of the early problems with flooding prior to development.

The Montana Fish and Game Department began development of the lake as a waterfowl management area in 1953. A drainage ditch was dug from Freezout Lake through Priest Lake to the Teton River. Dikes and water control structures were built, and water was back-flooded against these dikes to form six ponds. During construction, islands were built in the six ponds with the use of a bulldozer.

The management area currently consists of Freezout Lake, six ponds and Priest Lake with a total of 4,881.2 surface acres of water and 47.2 miles of shoreline (Figure 1). Table 1 gives the surface acreage and length of shoreline for each of the water areas. In addition, there are approximately 6,500 acres of upland on the area which are used primarily for waterfowl lure crops, pheasant habitat, and waterfowl nesting habitat.

In 1971, there were 107 islands on the area. This decreased to 105 in 1972 with the loss of two in Pond 6 due to erosion by wave action. Three large natural islands are on the area, one each in

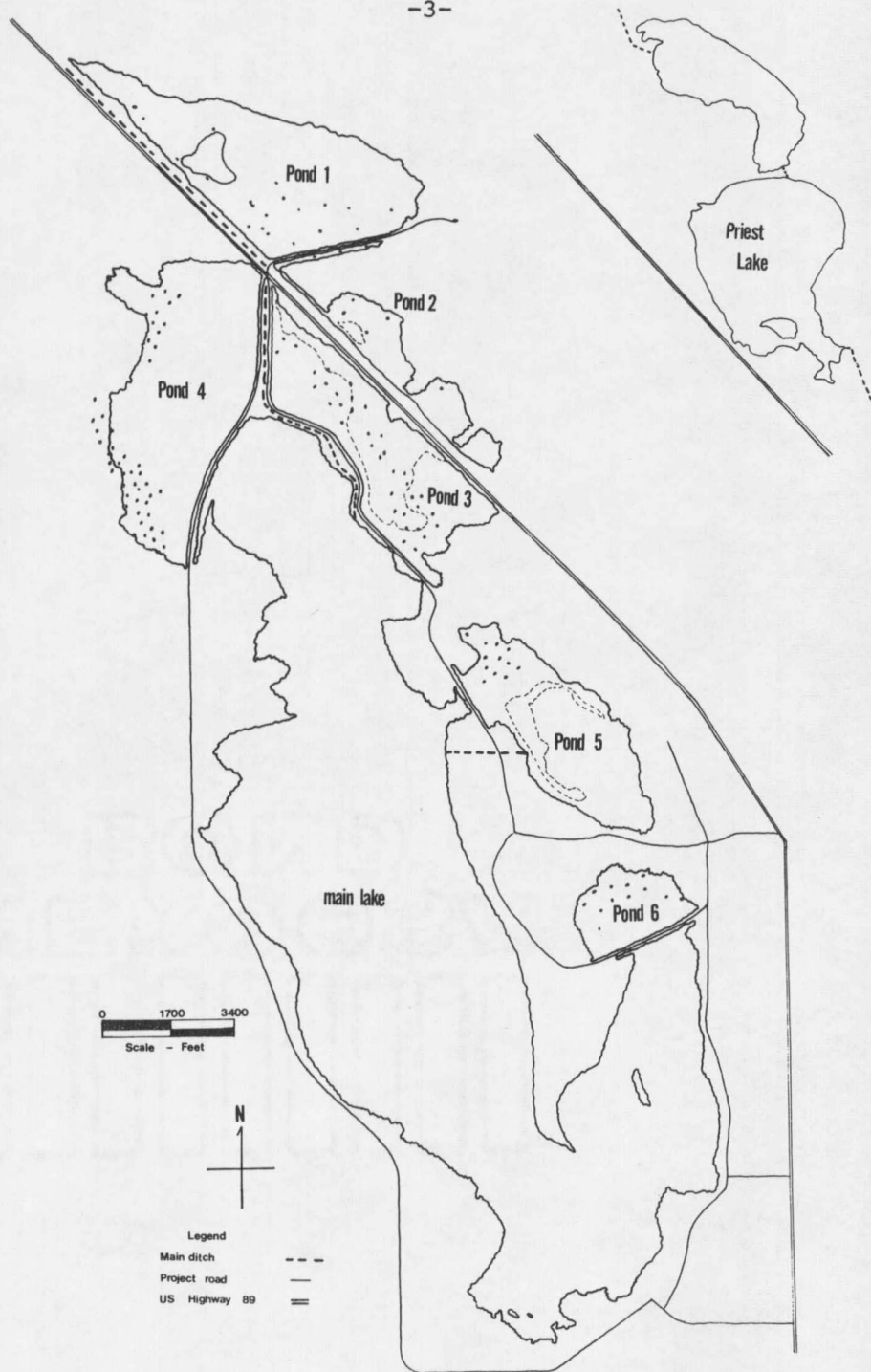


Figure 1. Map of Study Area Showing Ponds and Islands.

TABLE 1. SURFACE ACREAGE AND LENGTH OF SHORELINE FOR WATER AREAS ON FREEZOUT LAKE MANAGEMENT AREA.

Water Areas	Acres	Shoreline (miles)
Pond 1	437.84	4.35
Pond 2	122.73	4.92
Pond 3	198.72	5.21
Pond 4	470.50	4.35
Pond 5	288.58	3.55
Pond 6	107.47	1.71
main lake	2,803.63	17.00
Priest Lake	<u>451.72</u>	<u>6.12</u>
Total	4,881.19	47.21

the main lake, Priest Lake and Pond 1, measuring 5.1, 6.1 and 22.9 acres, respectively. The remainder of the islands are man-made except for two small natural islands in the south end of the main lake. The 60 man-made islands which were measured ranged in size from 9 x 28 feet to 77 x 149 feet.

The average daily temperature for the month of March over the past 10 years was 32.5 F. The average maximum daily temperature over this same period for March was 45.3 F. April was the first month of the year to reach an average daily temperature of 40 F or above with a 10 year average of 46.4 F.

METHODS

Nest surveys were conducted during April and May in 1971 and 1972. Due to the open nature of island vegetation at this time, a majority of nest sites were located by observing the goose on the nest. Incubation was assumed to have been initiated when a goose was repeatedly observed on a nest for two or more days. When incubation had been well established at most of the nest sites, a search was conducted of all the islands and areas of observed goose activity along the shore. During initial searches, clutch sizes and nesting progress were recorded at each nest. Thereafter, nest sites were left undisturbed until nesting activity was believed to have terminated, at which time the site was re-examined to determine the fate of the nest.

In 1971, bimonthly brood counts were conducted. In 1972, effort was made to make counts at one-week intervals. Brood observations were made with the aid of a 7x35 binocular and a 25X spotting scope. Gosling age was recorded after the method described by Yocum and Harris (1965).

To assess Canada goose breeding age, goslings were individually marked with plastic neck collars (Sherwood, 1966) in 1969, 1970 and 1971. The numbers of wild trapped goslings marked were as follows: 1969, 56 goslings, yellow collars with black symbols; 1970, 67 goslings, red collars with white symbols; 1971, 28 goslings, white collars with black symbols. In addition, 10 yearling geese released

from the captive flock in 1970 were marked with yellow collars.

Island vegetation was studied by running transects the length and width of all the islands in Pond 4 and all other small islands used by geese for nest sites. On the large island in Freezout Lake, which was approximately 150 x 876 feet, transects were run the length and width of the island, but recordings for the length of the island were made only at alternate 100 foot intervals. On the large island in Priest Lake, two bisecting 100 foot transects were placed at each nest site with one line perpendicular and the other parallel to the shore.

A modification of the method described by Daubenmire (1959) was used to measure vegetation. Canopy coverage of the vegetation was estimated at 5-foot intervals along a 100 foot tape within a 2 x 5 dm. frame and recorded by plant species according to the following classes: 1, 0-1%; 2, 1-5%; 3, 5-25%; 4, 25-50%; 5, 50-75%; 6, 75-95%; and 7, 95-100%. Height of vegetation was recorded at each plot with the use of a stake marked off at 3-inch intervals. The amount of bare ground, rock and litter was recorded for each plot. These transect measurements were made in July and August, 1971.

During the 1972 period of nesting activity, analysis of nest site vegetation was conducted. To keep disturbance to a minimum, only four plots were taken at each nest site. One 2 x 5 dm. plot was taken in each cardinal compass direction at a distance of two feet from the

nest to avoid any effects of nest construction on the vegetation. Canopy coverage was recorded for bare ground, rock, fallen litter, standing litter, living grass and living forbs. Height classes were recorded for standing litter, living grass and living forbs.

In 1972, the shoreline vegetation of the major brood areas was cover mapped. Canopy coverage was recorded in each type by taking 20 plots along a 100 foot tape.

Island water-depth measurements were taken at a point approximately halfway between the closest shore and each island. The measurements were then correlated to water levels recorded at the time of the nesting season to determine the water depth between each island and the closest shore during the nesting season.

The distance of each island to the closest shore was measured from 1966 aerial photographs. Distance to and height above water were recorded at each nest site in 1972 at the time when nests were re-examined to determine fate.

