MOVEMENTS, SURVIVAL, AND REFUGE USE BY LOCALLY PRODUCED POST-FLEDGING RING-NECKED DUCKS IN MINNESOTA

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SUMMARY OF FINDINGS

The Wetland Wildlife Populations and Research Group of the Minnesota Department of Natural Resources (MNDNR) initiated a study in 2006 to examine the use and survival benefits of waterfowl refuges to locally produced ring-necked ducks (*Aythya collaris*). The fall of 2007 was the 2nd year of this 4-year study. During 2007, we successfully captured and implanted 52 ring-necked ducks with radio-transmitters before fledging. Ducks were tracked weekly by aircraft and from telemetry receiving stations on 14 waterfowl refuges. Locally produced ring-necked ducks used state and federal waterfowl refuges, but use was not evenly distributed among refuges; 4 refuges received the majority of use and 7 refuges were never used by marked birds. Refuge use also increased markedly during hunting season. Additional data collection in 2008 and 2009 will be aimed at addressing survival benefits of refuge use to young birds.

INTRODUCTION

The MNDNR Fall Use Plan recognized sizable populations of resident breeding ducks as a cornerstone to improving fall duck use. Although breeding ring-necked duck populations have been increasing continentally, they appear to be declining in Minnesota (Zicus et al. 2005). Further, hunter harvest of ring-necked ducks has declined in the last 20 years in Minnesota even as numbers of these birds staging in fall on most traditional ring-necked duck refuges (Federal and State) have increased in the state (Wetland Wildlife Populations and Research Group, unpublished data).

Factors influencing resident populations of ring-necked ducks are poorly understood, and efforts to better understand their status began in 2003 with development of a breeding-pair survey. Minnesota's Fall Use Plan identified the need to better understand the role of refuges in duck management. The influence of north-central Minnesota refuges on the distribution and welfare of resident ring-necked ducks is unknown, as well as the influence that the distribution of the resident population might have on that of migrant ring-necked ducks staging in the fall. Post-fledging ecology of many waterfowl species has not been documented, and this study provides information for an important Minnesota species.

The intent of this project is to determine whether refuges benefit locally produced ring-necked ducks and increase survival. Understanding movements and refuge use by locally raised ring-necked ducks in the fall may provide valuable insights into the distribution of refuges required to meet management objectives for ring-necked ducks in Minnesota.

OBJECTIVES

1. Characterize post-fledging movements of local ring-necked ducks prior to their fall departure.
2. Estimate survival of locally raised birds during this period.
3. Relate the survival of locally raised birds to their relative use of or proximity to established refuges (federal and state) in north-central Minnesota.

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STUDY AREA

The study area lies in the heart of the Laurentian mixed forest province of Minnesota which is characterized by a mixed coniferous and hardwood forest landscape pocked with lakes, many of which are dominated by wild rice. The study area encompasses a significant portion of the core of the ring-necked duck breeding range in Minnesota and 14 important ring-necked duck refuges (Figure 1, Table 1). These state and federal refuges are closed to public hunting, thus providing security areas for ducks during the fall migration.

METHODS

Night-lighting techniques were employed to capture pre-fledging ring-necked ducks throughout the study area during August. Ducklings were aged and their sex was determined at the time of capture (Gollop and Marshall 1954). Radio-transmitters were implanted dorsally and subcutaneously on flightless ring-necked ducks following techniques developed by Korschgen et al. (1996). The ducks were then allowed several hours to recover from surgery before release at their capture location. These methods were similar to those employed during the pilot study in 2006, except that in 2007 we attached mesh to the back of transmitters to increase retention rates (D. Mulcahy, USGS, Alaska Science Center, personal communication). We also marked ducklings with nasal saddles to allow examination of natal philopatry in the spring, which was a new objective in 2007.

By early September, radiotelemetry stations were established at each refuge as a means of quantifying refuge use. These stations consisted of a tower with a four-element yagi antenna pointed toward the primary waterfowl use areas of each lake within the refuges. In some cases, more than 1 antenna was used so that more area could be covered. The receivers were programmed to scan all transmitter frequencies each hour and were equipped with data-loggers to store the data (Advanced Telemetry Systems DCC II Model # D5041). The data were downloaded weekly from the data-loggers from mid-September through early November. The data were then immediately examined to determine presence/absence of radio-marked birds. Reference radio-transmitters were stationed permanently at each refuge to ensure that receivers and data loggers functioned properly. Flights with telemetry equipment were also done twice weekly throughout the fall to document the locations and survival of radio-marked birds within the study area.

RESULTS

We captured 52 ducklings with night-lighting techniques between 4 August and 3 September 2007. Capture locations were distributed throughout the study area, but more ducklings were captured on the western half of the study area (33 in western counties compared to 19 in eastern counties, Table 2).

Prior to opening of the hunting season on 29 September, 91% of birds were located each week from aerial surveys or telemetry tower locations. The week that hunting opened, 89.5% of birds were located, but success rapidly dropped thereafter. Success in locating birds declined over the field season as birds began moving more in preparation for migration. Transmitter signals could be detected from a distance of about 2 miles.

By the end of the tracking season, 17 radio-marked birds were known to have died, of which 5 were harvested by hunters. Four of the 5 hunter-harvested birds were shot during the first 2 days of the season. The remaining hunter-shot bird was harvested on 20 October. Natural sources of mortality based on evidence at the site where the transmitter was found included predation by mink (*Mustela vison*) and other mammals (7), great-horned owls (*Bubo virginianus*) or other raptors (3), and unknown sources (2). During hunting season, hunters may have crippled some of these birds before predators consumed them. Losses to predation (6)

prior to hunting season were similar in number to those (3 predation + 2 unknown causes) after the opening, though formal survival analyses have yet to be performed. Three birds were harvested after the tracking period (2 in Louisiana, 1 in Illinois). Four radios were thought to have dehisced because they were retrieved from open water, but only 2 of these occurred before the end of the tracking season.

Refuge use was documented for 20 radio-marked birds during the fall migration period; however, not all refuges were used equally. The most heavily used refuges were Mud Goose, Drumbeater, and Tamarac National Wildlife Refuge (NWR). Seven radio-marked birds were located on Tamarac NWR. No radio-marked birds were documented at Rice Lake NWR this year, but this refuge was outside the capture area and we expected use of this refuge by radio-marked birds to be less than for refuges located within the capture area. However, Rice Lake NWR is an important staging area for ring-necked ducks in the fall, so we will continue to monitor this refuge throughout this study. Several state refuges also received no documented use by radio-marked birds this year (Table 1). Refuges were rarely used before hunting season, but use increased markedly with the onset of hunting (Figure 2).

DISCUSSION

Two field seasons remain. In 2008, field methods will be similar to those in 2007. Transmitter range in 2007 was less than expected, but it was sufficient to meet study objectives. Therefore, we will continue to use the same transmitters in 2008. In 2008, we will also attempt to locate ring-necked ducks that received nasal saddles as post-fledging birds in 2007. If few birds are resighted, we will discontinue marking with nasal saddles in 2008. However, if we are able to resight birds, we will continue these methods until the end of the study to document the degree of natal philopatry in young ring-necked ducks. This study will conclude in 2009. More formal analyses will be conducted at the conclusion of the study. Results and discussion of these analyses will be included in future Summaries of Wildlife Research Findings.

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Table 1. National Wildlife Refuges and Minnesota State Refuges included in the study area, approximate location of the refuges, number of recording telemetry stations established on each refuge and the use of each refuge by radio-marked post-fledging ring-necked ducks.

Refuge	Location	Receivers	Activity
Rice Lake National Wildlife Refuge	5 mi SSW of McGregor	4	No
Tamarac National Wildlife Refuge	16 mi. NE Detroit Lakes	3	Yes
Donkey Lake	6 mi. SW Longville	1	Yes
Drumbeater Lake	2 mi. N of Federal Dam	1	Yes
Fiske and Blue Rock Lakes	8 mi. SE Northhome	1	Yes
Gimmer Lake	10 mi. SE Blackduck	1	No
Hatties and Jim Lakes	13 mi. SE Blackduck	1	No
Hole-in-the-Bog Lake	2 mi. SW Bena	1	No
Mud Goose Lake	4 mi. SSW of Ballclub	1	Yes
Lower Pigeon Refuge	4 mi. S Squaw Lake	1	Yes
Pigeon River	6 mi. S Squaw Lake	1	No
Preston Lakes	22 mi. ENE of Bemidji	1	No
Round Lake Waterfowl Refuge	8 mi. N Deer River	1	No
Rice Pond	9 mi. E of Turtle River	1	Yes

Table 2. Ring-necked duckling captures per county, 2007.

County	Captures
Aitkin	1
Becker	6
Beltrami	17
Cass	9
Clearwater	5
Hubbard	3
Itasca	9
Koochiching	2

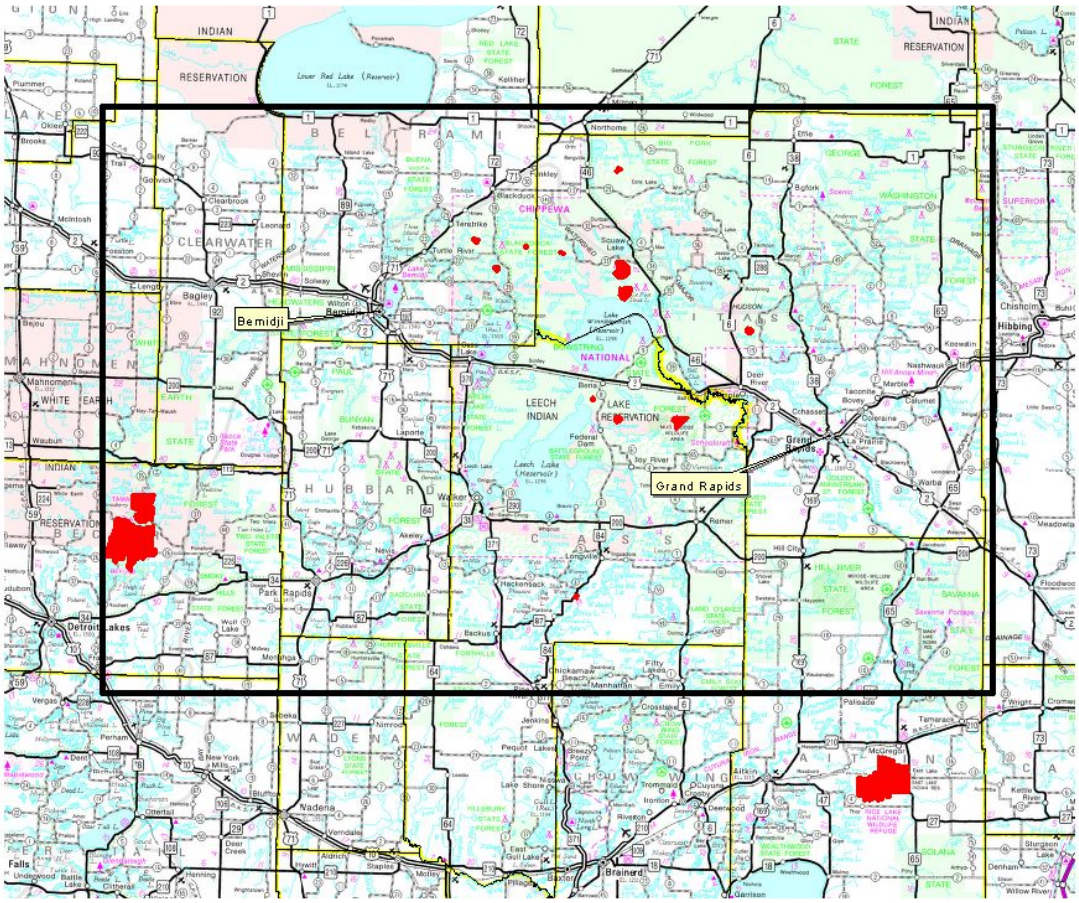

Figure 1. Ring-necked duck study area depicting 12 state waterfowl refuges and 2 National Wildlife Refuges in red.

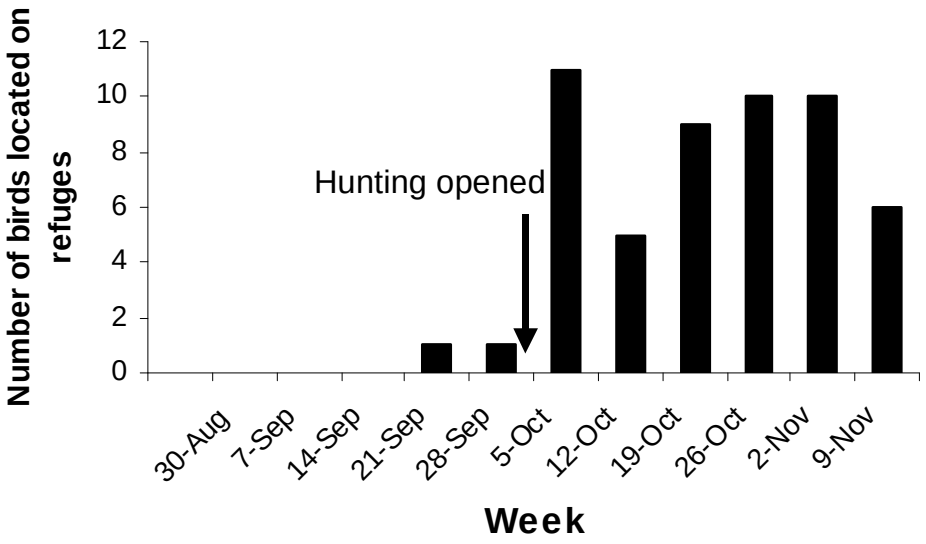

Figure 2. Use of refuges by post-fledging ring-necked ducks before and during hunting season in 2007.