Cackling Goose Banding on Yukon Delta National Wildlife Refuge, Alaska, 2015

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SUMMARY: In 2015, banding of cackling [Canada] geese (*Branta hutchinsii minima*) was directed at molting flocks of non-breeding and failed breeding geese along the Aknerkochick River, Yukon Delta National Wildlife Refuge (YDNWR), Alaska. We captured and marked a total of 117 birds during ten drives at four sites between 16 and 19 July. Morphological measurements (culmen, tarsus, and weight) of all adults and goslings were taken and recorded. Birds were then marked with a size 7A federal aluminum leg band and sampled for influenza A viruses and antibodies. This was the first season using helicopter-driven goose capture techniques. Despite best efforts, the total number of geese banded fell below the YDNWR capture objective of 250-500 birds. This was likely a result of the late timing of banding activities in relation to the 2015 breeding season’s nesting phenology; the majority of birds were already flight capable.

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KEYWORDS Banding, cackling goose, corral trap, Yukon Delta National Wildlife Refuge, YDNWR, Aknerkochik River

INTRODUCTION

The Yukon Delta National Wildlife Refuge (YDNWR) (Figure 1) is one of North America’s première waterfowl nesting areas, with between 2-3 million waterfowl utilizing the refuge annually, including 95% of the entire world population of cackling geese (formerly a subspecies of Canada geese, *Branta hutchinsii minima*, hereafter ‘cackling goose’) (Mallek and Groves 2010). For many years, the status of the cackling goose population has been of concern to wildlife managers in the Pacific Flyway. Fall aerial surveys in the Klamath Basin documented a decline from a peak count of 385,000 birds in the late 1960s to less than 50,000 birds by the early 1980s (O’Neill 1979; Raveling 1984). In 1984, the Yukon-Kuskokwim Delta Goose Management Plan was developed to provide guidance about harvest strategies and conservation efforts for cackling geese.

The YDNWR, in collaboration with the Division of Migratory Bird Management, has conducted a long-term annual banding program that was initiated in the early 1980s. Data from this program has been used to evaluate annual harvest rates, determine distribution of harvest, and set sustainable harvest goals for the cackling goose population (Bart 1998, Pacific Flyway Council 1999, Stehn 2011, Sanders 2012). The refuge banding target is to mark 250-500 cackling geese annually.

Figure 1. Yukon Delta National Wildlife Refuge, AK.

At times, additional objectives are included in the program. During the 2015 effort, avian influenza sampling was conducted on live geese in order to collect...
samples complimentary to those collected during the spring subsistence harvest of geese. These samples will be used to assess genetic connectivity with the HPAI H5N8 virus detected within the Pacific Flyway during the winter of 2014-2015 (Ramey et al. 2016).

METHODS & RESULTS

Study Area
Capture and marking of molting cackling goose flocks was carried out at four sites along the Aknerkochik River, 31 km NNW of Newtok, AK (61°15’N, 164°55’W; Figure 2). Capture sites along the Aknerkochik River were chosen based on prior YDNWR cackling goose banding sites with traditional high density molting habitat and goose concentrations. Total capture area was approximately 1.4 km². Base of operations for this effort was Kanaryarmuit Field Station (KFS).

Figure 2. Location of the Aknerkochik River

Capture and Marking
Historically, goose banding efforts on the YDNWR occur during two periods: (1) the second week of July for non-breeding and failed nesting birds (typical period of YDNWR banding) and (2) the last week of July for brood flocks (historical period of USGS research banding; Craig Ely, Alaska Science Center). Banding efforts in 2015 focused on the earlier period.

An aerial reconnaissance survey was conducted on 14 July 2015 by USGS biologist Spragens (YDNWR detaillee) and YDNWR pilot Robert Sundown to determine locations of molting flocks along the Aknerkochik River. Potential capture sites were identified and the molting stages of goose flocks were assessed to better gauge capture timing in relation to molt phenology.

Field personnel and gear were deployed to KFS between 15 and 16 July. Capture operations commenced on 16 July and concluded on 19 July. A helicopter was used to herd molting cackling goose flocks and move personnel between sites. Dates for initiating capture operations were constrained by YDNWR helicopter restrictions; the coastal zone is closed to helicopter use during the waterfowl nesting season defined as 15 May to 15 July (page 185, USFWS 1988). See Spragens (2016) for further discussion of the use of helicopters for capture of molting geese.

The capture pen and lead nets (collectively referred to as a ‘corral trap’) were set up by field personnel in advance of the drive to prevent the dispersal of geese during capture operations. The corral trap was set up in the driest area of a site to minimize exposure of geese to moisture. Wet conditions will compromise the integrity of their feathers and/or down and therefore their ability to thermoregulate while being held for processing. One lead approximately 200 m in length was set up parallel to the river and 50-100 m inland from the high tide line. A second, shorter lead ran perpendicular from the pen to the river’s edge (Figure 3). Leads were made of flexible, 1.2-m wide netting with 1-cm mesh and were held up by T-shaped, fiberglass poles (1 cm in width, 2 m in length) placed every 1.8 m.

Figure 3. Crew deploying the corral trap leads

The capture pen was circular in shape (6 m in diameter) and was constructed of flexible, modified rocket-net netting (1.5-m wide) with 2.5-cm mesh. The capture pen netting was held up by T-shaped, fiberglass poles (2.5 cm in width, 2 m in length) and placed every 1.8 m (Figure 4). A 1-m wide opening in the capture pen was positioned at the convergence of the two lead nets.
Typically, no net covering for the top of the pen is necessary because the geese are flightless. However, in 2015, many birds exhibited advanced primary growth and could catch enough lift to fly out of the capture pen when there was sufficient wind. To prevent this, excess netting was draped over the upwind side of the capture pen, and the pen diameter was narrowed in relation to wind direction to minimize the chances of escape.

A capture effort required two people to be dropped off near the capture pen to secure the capture pen net into position. The net was left on the ground until time to commence capture operations to prevent inadvertent captures outside of actual drive activity. These two crew members were stationed at the ends of the two leads during the drive. Remaining crew members were dropped off at strategic points to function as extensions of the lead net. The line of personnel extends all the way to the river bank (depending on the tidal direction of the particular capture site). A minimum of one person was stationed on the opposite bank of the river to act as deterrent and prevent geese from crossing the river. In an aircraft-supported drive, one plane would act as a blocker at the end of the short lead, a second plane would be used to herd geese into the river channels (the natural reaction of adult molt flocks), and a third plane would coordinate operations from the air by directing personnel, describing flock locations, and narrating the status of the capture drive progression. In 2015, those three roles were condensed into one aircraft, the helicopter, with a passenger acting as drive coordinator. Each crew member was equipped with a RACAL radio that was used for coordination with other ground crew members and the aircraft.

After the net for the capture pen was secured, the helicopter would range out between 0.25-0.5 miles from the capture pen. The helicopter would then slowly herd small flocks of cackling geese towards the river channel, using the tidal current to assist movement of geese towards the trap. When flocks were aggregated in front of the corral trap, the helicopter would then slowly nudge the flock up onto the bank and coax the birds into running towards the capture pen. Because molting geese prefer to remain aggregated in flocks, only a few geese need to be moving in the right direction before the others will follow. Once geese were on land and within the leads, crew members stationed as extensions of the lead would stand-up to further encourage movement towards the capture pen. As geese progress further into the leads, personnel started walking slowly towards the pen, collapsing into an arc that spans from one lead to the other. The helicopter, maintaining a safe distance behind ground personnel, hovered outside of the arc to encourage the geese to continue moving towards the pen and maneuvered between the two leads to redirect the movement of the geese when necessary. After all of the geese entered the capture pen, it was closed using 2 m of extra netting that was draped around one of the entrance gate posts. Approximately 30–60 minutes were required for the helicopter and biologists to drive geese into the corral trap.

Geese were held in the capture pen until processed. A standard federal metal leg band (size 7A) was applied to all captured birds. Morphological measurements (culmen, tarsus, and weight) were recorded and oropharyngeal and cloacal swabs, whole blood, and sera samples were collected to test for influenza A viruses and antibodies (Figure 5; USGS-ASC IACUC, see Ramey et al. 2016).

- **RESULTS**

**Banding Results**

A total of 111 adult and 6 hatch-year cackling geese were captured and marked during ten drives conducted at four different capture sites (Table 1). The number of geese banded was below the capture goal (250-500) and below the average number of marked birds (~315/yr) compared to prior seasons.
NEW BANDS 2015

<table>
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<th>AGE</th>
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<td>42</td>
<td>111</td>
</tr>
<tr>
<td>Young</td>
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<td>2</td>
<td>6</td>
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<tr>
<td>TOTAL</td>
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<td>44</td>
<td>117</td>
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Table 1. Age and sex ratios of cackling geese captured at molting sites along the Aknerekchik River, Alaska, 16-19 July 2015.

Avian Influenza Sampling

A total of 115 birds were sampled during the 2015 effort. All samples came back negative for influenza A virus (IAV) via isolation. Serologic screening is ongoing to test for prior exposure to highly pathogenic avian influenza.

Non-target By-catch

No non-target species were captured during the ten molt drives that were conducted in 2015. We did capture 1 or 2 cackling goose family flocks, which was unusual for this capture region, but was likely influenced by this season’s relatively late timing of capture efforts in relation to the early nesting phenology.

Mortality

No mortality events occurred as a result of 2015 banding activities.

DISCUSSION

Capture numbers were low in 2015 due to the mismatch between the timing of molt and the timing of capture efforts. Most geese were in the advanced stages of primary growth, which enabled a number of individuals to escape the drive line by flying, especially when assisted by wind. A group of 30-100 individuals would be rounded up at the start of a drive, but numbers would decline to 6-32 geese by the time the flock entered the capture pen. Flightless geese tend to aggregate in groups and to walk or run along the river banks or seek refuge in the major tidal sloughs. This behavior allows them to be driven by a line of people. But when the majority of the geese are flight-capable, the remaining geese disperse into smaller groups that are too scattered to drive efficiently. By the final day (19 July) of trapping, 90+% of geese were flight-capable.

Two factors contributed to the mismatch between the timing of molt and the timing of capture efforts. The timing of capture operations is frequently targeted towards average timing of nesting if dates must be chosen in advance. In 2015, nesting phenology was earlier than average, so timing of molt was also early. Secondly, we decided to employ a different procedure than has been used previously on YDNWR for capturing cacklers by using a Robinson (R-44) helicopter to assist with goose drives. By refuge policy, helicopters cannot be used within the coastal zone of the refuge between 15 May and 15 July, so this constrained our choice of dates for capture operations and we did not have the flexibility to adapt to the seasonally variable molt timing.

The potential use of a helicopter for goose molt drives has been discussed by refuge staff for several years prior to its use in 2015. Major benefits for use of a helicopter in this type of goose capture are: (1) the potential to reduce the distance birds are driven from initial spotting site to capture pen, (2) the ability to repeatedly use the same corrall trap setup, allowing for quick and efficient capture, reduced handling times by holding smaller flocks per drive, and reduced disturbance to other species across large stretches of the coastal molting region, (3) minimizing disturbance along the river’s edge as capture pens can be placed further inland without having to disturb stretches of river when using a floatplane to haul gear and personnel, 4) the number of days capture crews are operating in the coastal molting region can be reduced because capture operations are more efficient, 5) the helicopter can access molting areas that are not accessible by floatplane, and, finally, 6) capture crew size can be greatly reduced compared to either floatplane or boat-assisted capture scenarios.

To maximize the value of the helicopter as a capture tool for molting cackling geese on the central coast of YDNWR, dates of operation need to be flexible to allow for fluctuations in annual nesting and molting phenology. The closure of the coastal zone of the refuge to helicopter access from 15 May to 15 July is an internal refuge policy developed in conjunction with the 1984 Yukon-Kuskokwim Delta Goose Management Plan and the YDNWR Comprehensive Conservation Plan (USFWS 1988). Helicopters can be used during the closure period at the discretion of the refuge manager, but any use needs to be balanced with potential disturbance impacts to not only the focal species, but non-target species as well. Many waterbird species nesting in this zone have broods at this same time of year. Refuge staff may wish to consider if the use of a helicopter for goose capture is an activity that should be allowed during the late end of the closure period to maximize the success of our efforts.

We would recommend that a second helicopter-assisted capture session be attempted that aligns with molt
phenology for cackling goose banding operations. The benefits as an effective capture strategy should be thoroughly explored by YDNWR, both in terms of disturbance impacts and long-term logistics. Additionally, the potential application of this technique in future seasons may increase accessibility to regions where suspected aggregations exist, present an opportunity for multi-species banding efforts, and enhance the refuge’s ability to collaborate with other banding operation groups.

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Maribel Glass, YDNWR  Andy Ramey, USGS-ASC
Stan Herman, pilot  Ivonne Romero, YDNWR
Elliot Hoffman, YDNWR  Kyle Spragens, USGS-SFBE

The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

LITERATURE CITED


