Monitoring and Avian Influenza Sampling of Nesting Waterfowl on Kigigak Island, 2009

by

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Introduction

As recommended by the spectacled eider recovery team (USFWS 1996), fieldwork on Kigigak Island continued for the 18th consecutive year. In addition, in response to a threat of highly pathogenic (HP) H5N1 Asian avian influenza (AI) being carried into the United States by migratory birds, the U.S. government has developed an interagency strategic plan to detect the virus in migratory birds in Alaska and the rest of North America (USDI 2006). There is also concern over the recent westward spread of avian influenza from Asia to Europe and Africa by migrating wild birds. Because many species that breed in Alaska winter in infected areas, the U.S. Fish and Wildlife Service has begun a sampling program to determine whether it is present in Alaska; and if it's not currently present, document when it arrives (US Interagency Working Group 2006). As a result, incubating females for four waterfowl species were sampled for the presence of avian influenza.

Study Objectives:

1. Document nesting chronology and quantify basic productivity parameters for Pacific black brant (*Branta bernicla nigricans*) and spectacled eiders (*Somateria fischeri*).
2. Capture and mark adult female spectacled eiders for estimation of annual survival.
3. Collect cloacal and oral-pharyngeal swabs from four species, including 50 emperor geese (*Chen canagica*), 50 spectacled eiders, 60 Pacific common eiders (*S. mollissima v-nigrum*), and 65 brant to detect presence of avian influenza.
4. Remove arctic fox (*Alopex* lagopus) prior to nest initiation.

Study Area

Kigigak Island (32.5 km^2) (60˚50'N, 165˚50'W) is located along the outer fringe of Yukon Delta NWR near the mouth of Baird Inlet. The island, bordered by the Ninglick River and the Bering Sea, contains many shallow ponds, lakes and a network of tidal sloughs. Habitat consists of low coastal tundra, sedges, and grasses. Spring and fall storm tides regularly inundate the island, except for upland areas, which are flooded only during severe storm tides.

Methods

Fox trapping occurred between 27 March and 18 April. Twenty, 220 conibear traps were deployed in bucket sets baited with canned tuna fish.

A six person camp was maintained from 13 May to 1 July. Personnel searched for spectacled and common eider and emperor goose nests on 45, 0.17 km^2 plots previously identified as preferred spectacled eider nesting habitat (Harwood and Moran 1993). Additional nests were located opportunistically while moving between plots. Three nesting concentrations of black brant were also selected and approximately 30 nests in each were located and monitored to determine fate.

Data were recorded according to guidelines developed by the USGS – Alaska Science Center (Grand 1993). On the initial visit, a white flag was placed approximately 3 m from the nest and nest location was recorded with UTM coordinates. Each egg was uniquely numbered to document the number of new, depredated, and inviable eggs on subsequent visits. Each egg was floated (Westerkov 1950) and candled (Weller 1956) to estimate days of incubation. Ten contour feathers were collected from each spectacled eider nest bowl to catalog samples for future DNA and stable isotope analyses. Nests were revisited every 7 days until hatch. On all nest visits, nest status (laying, depredated, abandoned, hatched) and egg status (number present, new, missing, inviable) were recorded.

Bownet traps (Salyer 1962) and mist nets were used to trap females late in incubation. Hatch dates were calculated based on egg float angle and candling data, assuming a 24-day incubation period for spectacled eiders and brant and a 26-day incubation period for common eiders and emperor geese. Female spectacled eiders were marked with a U.S. Fish and Wildlife Service metal leg band and a yellow, plastic, alphanumeric leg band. Coded nasal disks were also attached (Lokemoen and Sharp 1985). Two head feathers and tips of two primary feathers were also collected from spectacled eiders to catalog samples for future DNA and stable isotope analyses. The cloaca and oral cavity of each female were swabbed for avian influenza H5N1 testing (IAIWG 2006).

Nest initiation and hatch dates, clutch size, and fate were only reported for spectacled eiders and black brant. Estimated hatch dates for common eiders and emperor geese were used to determine timing of nest trapping. Initiation dates for nests found during laying were estimated by subtracting 1 day for each egg present. For nests found during incubation, egg float angle and candling data were backdated according to the incubation period for each species and a laying rate of one egg per day (Grand and Flint 1997). Hatch date was similarly estimated using egg float angle and candling data. For nests that survived to incubation, clutch size was the total number of eggs laid in a nest. Nests were defined a successful if $\geq$ 1 egg hatched. Nests that were found depredated or that contained all inviable eggs were excluded from nest success analysis.

Apparent fate of all spectacled eider eggs was documented. Eggs were classified as hatched if membranes or ducklings were observed. Depredated eggs exhibited obvious signs of depredation (e.g., several or all eggs missing or broken). If the clutch was intact or some eggs had hatched, cold eggs were assumed to be abandoned. If abandonment occurred after trapping the female, it was assigned as human caused. Infertile and addled eggs were recorded. When egg fate was undetermined, it was classified as unknown.

Results

No fox were trapped. A blizzard occurred the day after traps were set and covered most access points.

Kigigak Island lake was ice-free on 27 May.

A total of 99 spectacled eider nests were located on 31 plots. A total of 117 brant nests were located in three nesting concentrations. Eider nests were initiated between 18 May and 3 June with peak nest initiation occurring between 26-29 May. Brant nests were initiated between 21-27 May with peak nest initiation occurring between 24-25 May. Eider nests hatched between 14-29 June with peak hatch occurring between 21-24 June. Brant nests hatched between 15-22 June with peak hatch occurring between 18-20 June. Eider clutch size averaged 5.3 eggs (range 2-6 eggs, mode 5 eggs). Brant clutch size was 3.8 eggs (range 1-7 eggs, mode 4 eggs). Apparent nest success for brant was 89.6% (n=115).

The fate of 93 nests was determined, including: 68 (73.1%) hatched, 20 (21.5%) depredated, and 5 (5.4%) abandoned. The fate of 420 eggs was determined, including: 303 (72.1%) hatched, 83 (19.8%) depredated, 12 (2.9%) abandoned due to natural causes, 9 (2.1%) abandoned due to monitoring activity, 10 (2.4%) were inviable or addled, and 3 (0.7%) were damaged during handling, trapping, or when the attending female flushed from the nest.

A total of 72 spectacled eider females were nest trapped. Twenty-seven of these were new captures and they were banded with individually coded, plastic nasal disks and tarsal bands. Cloacal and oral-pharyngeal swab samples to detect avian influenza presence were taken from 50 birds. Similar samples were also taken from 50 emperor geese, 65 brant, and 59 common eiders.

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