

Name of Project: Differentiation of Wrangel Island snow goose flocks

Final summary

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Specific goals for this project :

- Monitor productivity (breeding phenology, clutch size, brood size and nesting success) of Lesser Snow Geese on Wrangel Island, comparing the Tundra River main colony with small colonies associated with Snowy Owls.
- Compare the ratios of northern and southern wintering geese on the main Tundra River colony with the ratios in small remnant colonies using genetic methods.
- Sample yearlings to examine genetic exchange from other populations.

Weather conditions. The spring of 2006 at Wrangel Island was warm and snow precipitation was low. Approximately 50% of snow cover on the Tundra River colony was gone by May 24, giving a good start for breeding geese. However, weather was generally cold in June and July. A stormy period in the middle of July with snow and strong winds did not have an effect on goose productivity.

Wrangel Island Snow Goose Population Number. By the spring 2006, the estimated number of Wrangel Island Snow Geese (WISG) was 130,000-135,000 birds. Spring surveys indicated that 23.9 % (N = 1435) of all geese were yearlings in area of the Tundra River colony on May 27-29.

Breeding phenology and nesting activity. Breeding phenology in 2006 was 5-6 days earlier than average. The first nest initiation on Tundra River colony was May 24. Peak nest initiation was May 29-31. The size of the main colony was similar to last year. Clutch size (the number eggs per nest) on the Tundra River colony in 2006 was 4.05 ± 0.03 (n=737). We estimated that about 700 eggs on Tundra River colony were abandoned (about 0.5% from total eggs or about 1 egg per 70 nests).

The first goslings hatched on June 22, 2006, which is earlier than average (mean is June 27 during 1970-2004). The peak of hatch occurred June 26-28. Mean brood size when leaving

colony was 3.74 ± 0.06 ($n=510$). More than 150,000 goslings left from the Tundra River colony in 2006.

Size of Tundra River colony and nesting success of geese. In 2006, Tundra River colony geese nested within the traditional colony boundaries (of the previous 15 years). Ground transects on the colony indicated a very high density of nests: 46,600 nests were on 875 ha. Nest success (proportion of nest hatching at least one egg) in 2006 was high (87.7%).

The ratios of northern and southern wintering geese on the main Tundra River colony as determined by face staining. Staining of facial feathers has been shown to indicate the wintering areas of WISG on Wrangel Island, based on past banding and collaring studies. Staining is acquired during feeding on intertidal sediments containing iron and other elements. This year, the first geese on the colony had light face staining (none or yellow), indicating association with the southern wintering area in California. Arrival of southern wintering area geese usually occurs with an early spring on Wrangel Island and bad weather on Chukotka, as occurred at the end of May in 2006. The earlier occurrence of geese with light face staining adds more evidence to a hypothesis about a spring migration route for southern geese through Chukotka.

A survey to measure the composition of various face staining classes was completed on the breeding colony before hatch. Sample size was 4,780 birds (about 5% of breeding geese). Geese with intensive red face staining (typically associated with the BC flock) made up 37.1% of the flock; red = 26.3% (associated with WA flock); yellow (associated with southern geese which migrate along the Pacific Coast in fall) = 19.9%; and none (southern geese) = 16.7%. A total of 63.4% of the flock had red face staining, indicating association with the northern wintering area (BC and WA). In 1993, I sampled 20% of the entire population (12,236 geese), and found: red = 59.7%; yellow = 19.6%; and none = 20.7%. This indicates that the proportion of northern wintering area geese (red) has increased and the proportion of southern wintering area geese (white) has decreased.

Snow Geese nesting outside the Tundra River colony. Up to 1,000 pairs of snow geese were breeding in 2006 outside the main colony. These geese bred in a different part of Wrangel Island in association with Snowy Owls. Clutch size outside the main colony was similar to the main colony, but breeding success was only half of the main colony due to predator activity.

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Sampling for genetic differences. We collected genetic samples (feathers and undershell membranes after hatch) to compare the ratios of northern and southern wintering geese on the main Tundra River colony. Samples were taken from 100 nests, including 10 samples from

neck-collared geese (with known wintering locations), for comparison with the ratios from small remnant colonies associated with Snowy Owls (35 nests). We also collected 30 samples (feathers) from yearlings during banding to examine genetic exchange from other snow goose populations. Genetic analysis is currently in progress at the Moscow Institute of Ecology and Evolution, Russian Academy of Science.