ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

Alaska Department of Fish and Game
Wildlife Restoration Grant

GRANT NUMBER: AKW-R-3-2019

PROJECT NUMBER: 1.0

PROJECT TITLE: Tracking Survival and Harvest Opportunity of Emperor Geese Following 30 Years of Hunt Closures

PERIOD OF PERFORMANCE: March 1, 2019 to June 30, 2022

PERFORMANCE YEAR: September 1, 2020 to August 31, 2021

REPORT DUE DATE: September 13, 2021

PRINCIPAL INVESTIGATOR: Tyler Lewis

COOPERATORS: U.S. Fish and Wildlife Service – Yukon Delta National Wildlife Refuge; National Park Service – Bering Land Bridge National Preserve

---

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Estimate seasonal and annual survival rates of adult female emperor geese throughout their breeding range in Alaska.

ACCOMPLISHMENTS: To date, we have deployed satellite transmitters in adult female emperor geese at two distinct breeding sites: (1) we deployed 30 satellite transmitters on the Yukon-Kuskokwim Delta, Alaska, during June of 2019, and (2) we deployed 20 satellite transmitters on the Seward Peninsula, Alaska, during June of 2021. We captured adult females on their nests using bow nets. Upon capture, birds were placed in small kennels and immediately transported to surgical facilities for implantation of transmitters into their body cavity. Transmitters weighed 60 g and are anticipated to last up to 3 years.

Transmitters were programmed on a repeating duty cycle which alternates 6 hours on (i.e., transmitting location data to satellites) and 72 hours off. In addition to latitude and longitude, transmitters collect data on body temperature and battery voltage, allowing us to track mortalities in near real-time. We assume a bird has died if sensors indicate a drop in body temperature with no concurrent decline in battery voltage. Moreover, our

transmitters were programmed to begin continually transmitting a mortality signal when body temperatures suddenly drop, thus reducing the risk that transmitters experience total failure before the mortality event is transmitted during an 'on' cycle.

As of September 1, 2021, 11 of the 50 tagged emperor geese have died, with mortalities occurring during the following seasons: Fall migration – 3 mortalities; Winter – 5 mortalities; Spring migration – 1 mortality; Breeding season – 2 mortalities. See Fig. 1 for a detailed location of each mortality. Moving forward, our sample size will increase over the next year as we deploy ≥30 satellite transmitters on the Yukon-Kuskokwim Delta. The addition of these transmitters will significantly increase our sample size, allowing us to provide more formal estimates of survival rates in future reporting periods.

OBJECTIVE 2: Assess seasonal availability of emperor geese to subsistence and sport hunters.

ACCOMPLISHMENTS: The current fall/winter hunt of emperor geese splits a statewide quota of 1,000 birds among 7 hunt areas. Season dates vary among the hunt areas to accommodate seasonal shifts in distributions of emperor geese, with season openings ranging from September 1 to October 16. Our data suggest that emperor geese are largely unavailable in northwest Alaska (Hunt area – RO501) as of September 1, and minimally available on the Yukon Delta (RO502) as of this date. Four tagged emperor geese migrated through the Yukon Delta during the first 2 weeks of September, with the last bird leaving on September 17; thus, sport harvest opportunities in this portion of the state appear restricted to the first 2 weeks of September. For the remaining hunt areas (RO503-07), emperor geese were widely available for most of the harvest season.

OBJECTIVE 3: Determine population delineation of emperor geese breeding on the Seward Peninsula.

ACCOMPLISHMENTS: To date we deployed 30 satellite transmitters on the Yukon-Kuskokwim Delta, where most emperor geese (~90%) breed, and 20 satellite transmitters on the Seward Peninsula, which is their primary breeding area in Alaska outside the Yukon-Kuskokwim Delta. The transmitters from the Seward Peninsula were deployed in mid-June of 2021 and have been transmitting data for <3 months as of this writing. The delineation of these two breeding populations will require minimum of one year on air for each batch of transmitters, and thus cannot be ascertained at this time.

OBJECTIVE 4: Describe survival and distribution of emperor geese during the flightless molt in Russia.

ACCOMPLISHMENTS: During summer of 2019, 20 of our tagged emperor geese migrated to and underwent the flightless molt in Russia, where their survival was 100%. For the summer of 2020, 9 of our tagged geese migrated to Russia for the flightless molt, again experiencing 100% survival. During the most recent summer of 2021, 22 of our tagged geese migrated to Russia for the flightless molt and 100% survived. See Fig. 2 for a map describing the annual distribution of our tagged emperor geese during the flightless molt in Russia.

OBJECTIVE 5: Determine observation availability of emperor geese during aerial surveys.

ACCOMPLISHMENTS: The U.S. Fish & Wildlife Service conducts an aerial survey of breeding emperor geese on the Yukon-Kuskokwim Delta during late May or early June each year. Data from this survey provides the principal management tool for emperor geese, whereby harvest openings and closures are predicated on discrete numbers of birds observed. We plan to examine timing of this aerial survey with arrival and departure times of our satellite marked birds to the Yukon-Kuskokwim Delta, thus providing novel information on goose availability during aerial surveys. However, the aerial survey was canceled for the summer of 2020 due to the COVID-19 pandemic and data from the 2021 survey is not yet available; accordingly, we will explore this topic further in future years.

OBJECTIVE 6: Describe winter distribution and habitat use of emperor geese.

ACCOMPLISHMENTS: Our tagged emperor geese wintered throughout the Aleutian Islands, Alaska Peninsula, and Kodiak Archipelago. See Fig. 3 for a map describing the annual winter distribution of our tagged emperor geese.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

To date we have deployed 50 satellite transmitters, 30 of which were deployed in June of 2019 on the Yukon Delta and 20 of which were deployed on the Seward Peninsula in June of 2021. All data for this project will be collected using satellite transmitters with lifespans of 3-4 years. Accordingly, the period of data collection (6-8 years) is considerably longer than the current lifespan of project funding. Nonetheless, we present several preliminary findings below:

- As of September 1, 2021, 39 of 50 tagged emperor geese were alive and transmitting. This rate of survival is in line with prior estimates from tagged emperor geese (annual survival of ~85%).
- We obtained >15,000 unique locations from our satellite transmitters thus far, adding new locations per individual every 72 hours (Fig. 4).
- 16 of our tagged geese spent the 2020 breeding season (mid-May to end of August) at the same location they were captured the prior year on the Yukon-Kuskokwim Delta. Because these birds were captured on their nest and have strong breeding site fidelity, these results strongly suggest that these 16 geese successfully bred during the 2020 breeding season. Had these birds been non- or failed-breeders, they would have departed the Yukon-Kuskokwim Delta for northern Russian in June.
- 22 of our tagged geese migrated to northern Russia in late June of 2021 to undergo the flightless wing molt, indicating that these birds either opted not to breed or had failed nests (Fig. 2). All these birds, however, spent time at their breeding locales on the before departing for Russia in late June.

- Several of our tagged geese used Saint Lawrence Island in the Bering Sea as a stopover site during their migration from the Yukon-Kuskokwim Delta to Siberia (Fig. 5).

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

Due to the ongoing COVID-19 pandemic, the deployment of satellite transmitters was suspended for 2020. Accordingly, we are behind schedule by one year and foresee a future request for a 1-year extension to our grant. Due to the aforementioned postponement, our project timeline will likely need to be extended until June 30, 2023, with future deployments of satellite transmitters scheduled for June 2022 on the Yukon Delta.

IV. PUBLICATIONS

There are no publications for this project at this time.

V. RECOMMENDATIONS FOR THIS PROJECT

Continue with project as initially planned.

Prepared by: Tyler Lewis – Principal Investigator, Alaska Department of Fish and Game

Date: August 28, 2020

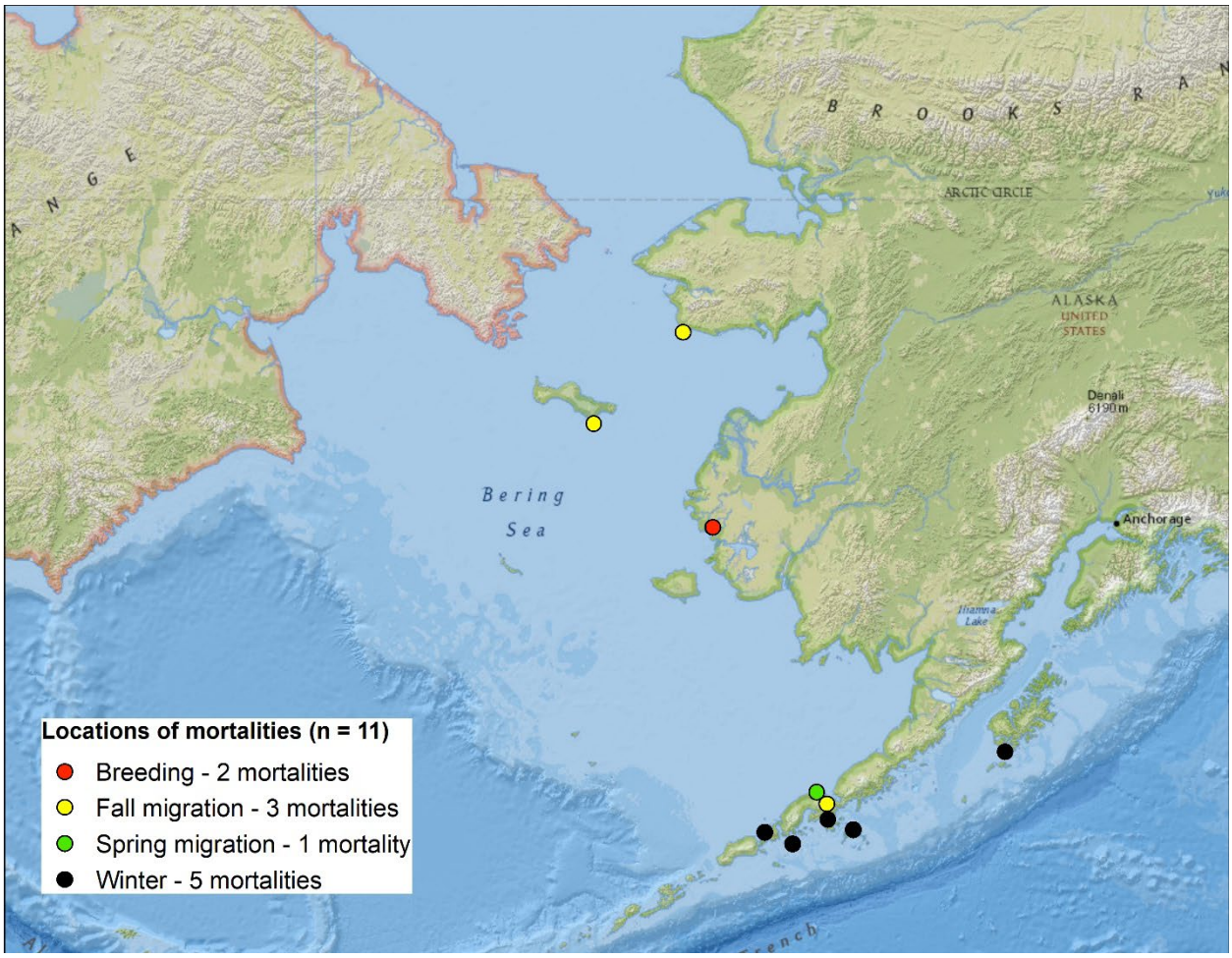

Figure 1. Mortality location (n = 11) of adult female emperor geese marked with satellite transmitters. Mortalities are color coded according to the major seasons within the annual cycle of emperor geese.

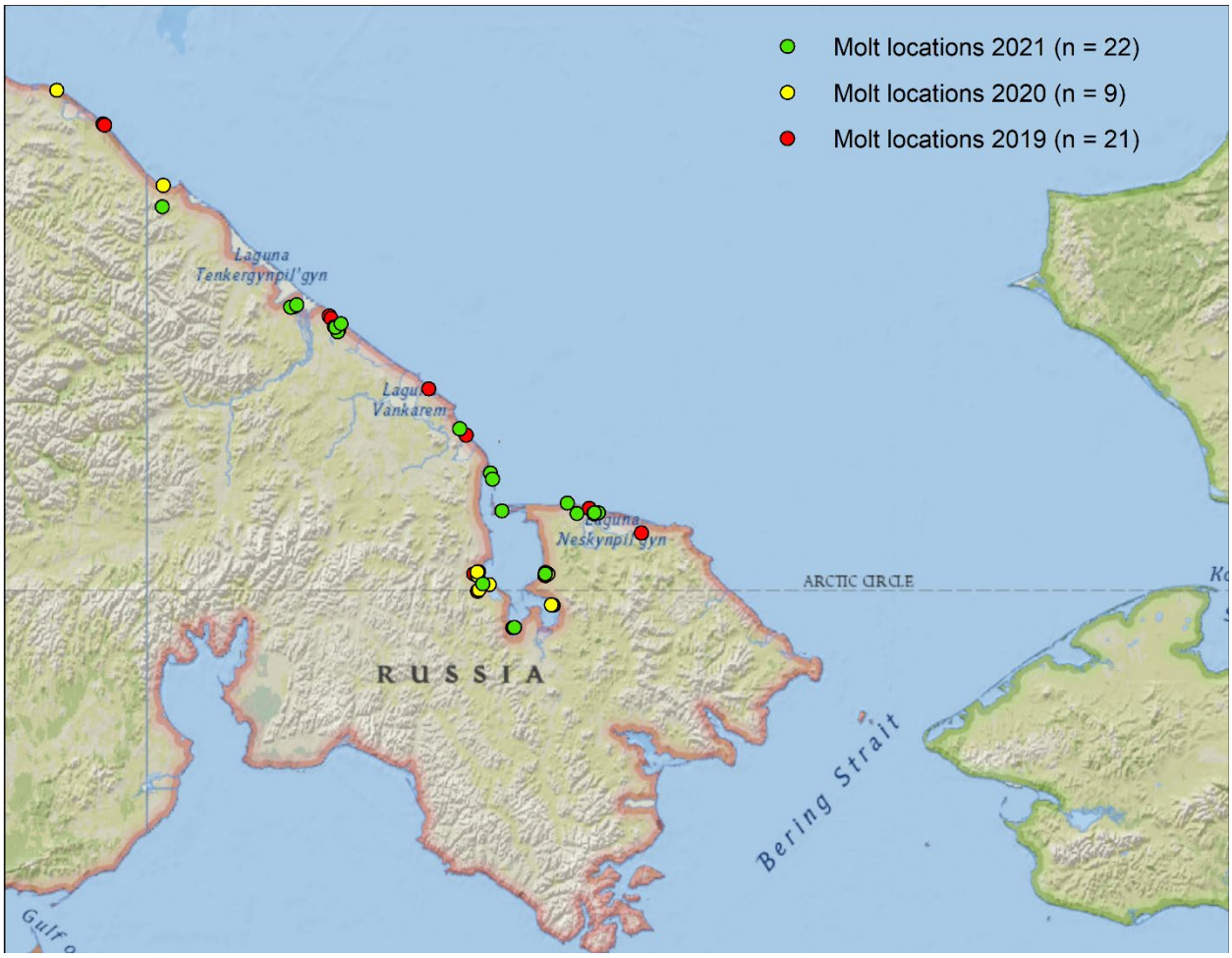

Figure 2. Molting locations of adult female emperor geese in northern Siberia during summers of 2019 (n = 21 geese), 2020 (n = 9 geese), and 2021 (n = 22 geese).

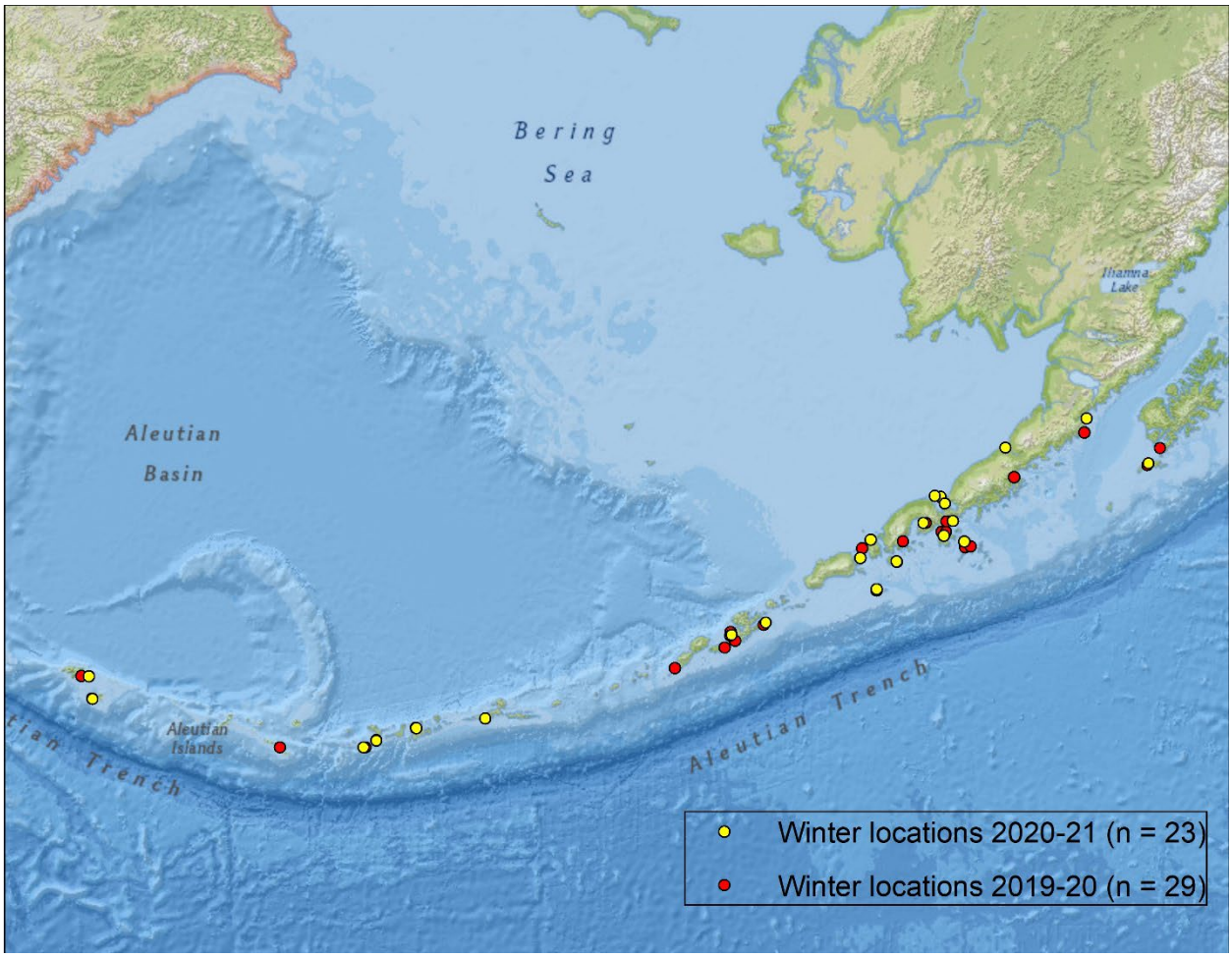

Figure 3. Overwinter locations of tagged adult female emperor geese during the winters of 2019-2020 (n = 29) and 2020-2021 (n = 23).

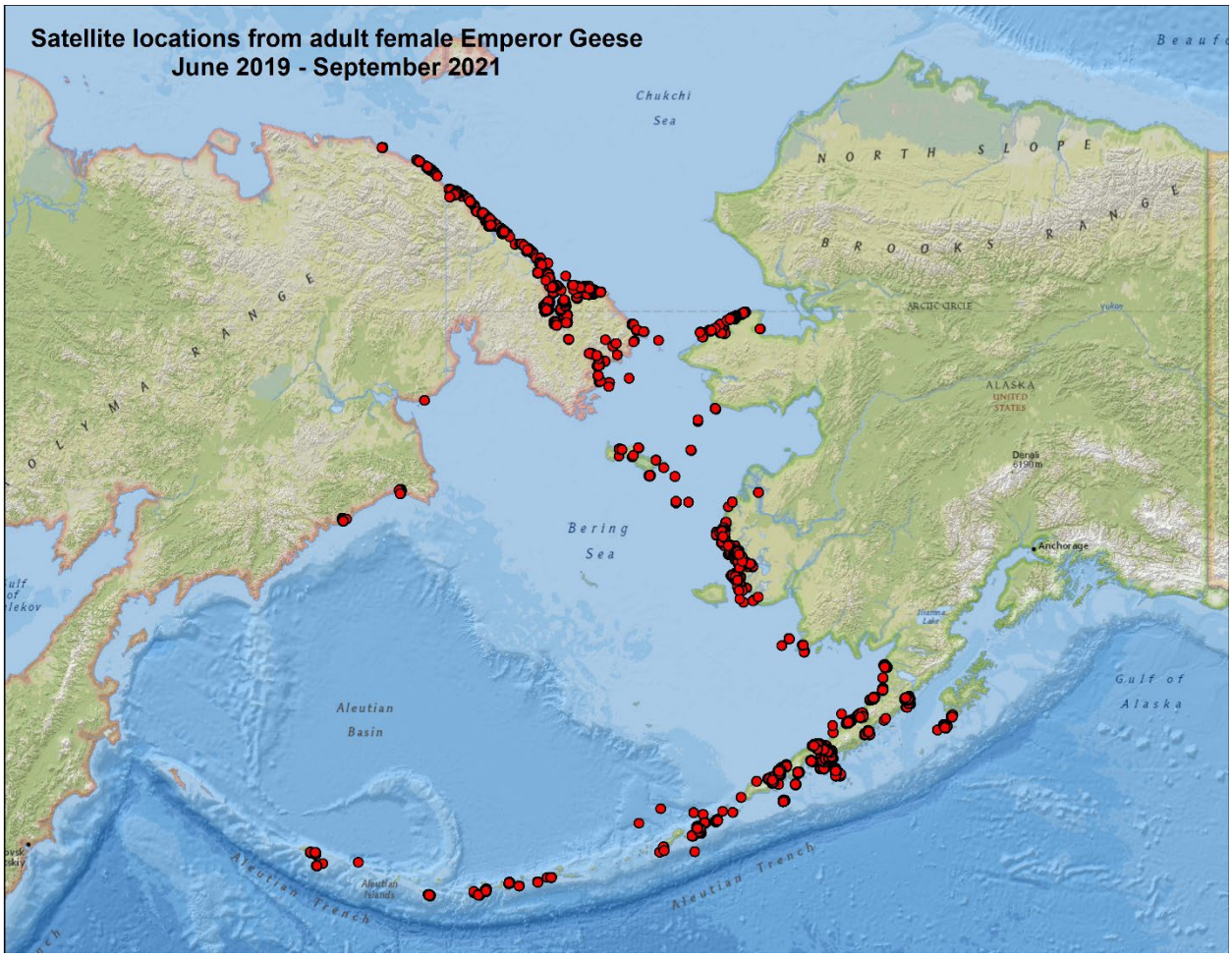

Figure 4. All high-quality locations (>15,000) from satellite-tagged adult female emperor geese during the period of June 2019 to September 2021.

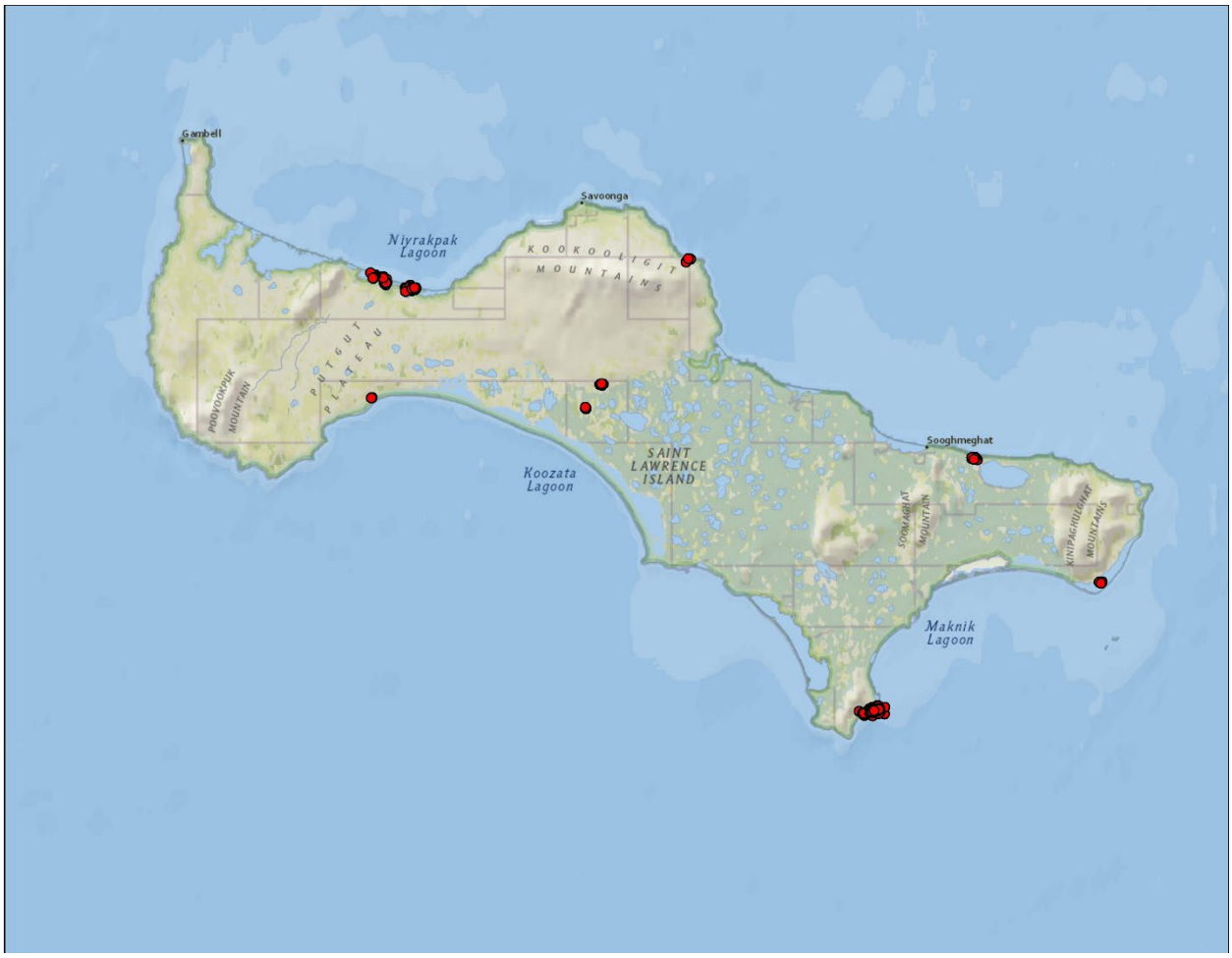

Figure 5. Stopover locations of tagged emperor geese on St. Lawrence Island during their migration from the Yukon-Kuskokwim Delta in Alaska to northeastern Siberia, 2019-21.