

**Sea Duck Joint Venture**  
**Annual Project Summary for Endorsed Projects**  
**FY 2004 – (October 1, 2003 to Sept 30, 2004)**

**Project Title (SDJV Project #38): Assessment of the Pacific Black Scoter Population: Population Size, Distribution, and Links among Populations: An Integrated Approach YEAR 1 of a 3 YEAR STUDY.**

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**Project Description:** Numbers of Pacific black scoters appear to have declined greatly, although survey data are imprecise and hinder detailed analyses of population trend. Little is known about the biology of black scoters, including delineation of subpopulations and links among annual cycle stages. This study integrates three elements (population surveys, satellite telemetry, and genetics) into a multi-pronged approach to determine population status and trends and provide the information necessary to make scientifically sound management decisions. These elements are complementary and benefit from being conducted simultaneously.

**Objectives:**

- a. Provide precise annual estimates of the size of the Pacific breeding population that will serve as a long-term monitoring tool.
- b. Estimate observer detection rates.
- c. Identify breeding, molting and wintering locations used by black scoters across the annual cycle.
- d. Use mtDNA sequence data to infer levels of site fidelity by testing for genetic differentiation among breeding and among wintering areas.

- e. Assess timing of movements in relation to population surveys and subsistence harvest.

### **Preliminary Results:**

**Population Surveys** Observers flew 63 transects totaling 3,185km using an amphibious Cessna 206. Remote portions of the survey area (interior Seward Peninsula and southern Alaska Peninsula) were intentionally not flown in 2004 due to logistics and several transects were not flown due to time limitations on the aircraft. The rear seat observer sat behind the left-seat pilot on 16 transects, roughly every 4<sup>th</sup> transect of the total 63 transects flown. These independent double-counts were used to estimate observation detection rates by matching observations of the same species, group size, and recorded locations. Average detection rate of scoters was 0.754.

Observers recorded 780 scoters along 63 200m-wide transect strips over 8 days between 12 and 21 June 2004 (Fig. 1). Observed density of scoters within high and low density strata in 2004 corresponded with the designed stratification.

The visibility-corrected total population estimate in 2004 was 93,071 (SE=14,662, CV=15.8%) scoters. Based on an approximate formula for power analysis of trends (Gerrodette 1987 Ecology 68:1364-1372, eq.20) in order to detect an annual trend of -3.4%, equal to a 50% decline in 20 years, with significance set at 0.10 and 80% power, 12 years of data at the observed sampling error CV=15.8% will be necessary.

Observations made in 2004 indicated lower population indices for scoters compared to 1989-97 surveys, 15 to 7 years earlier. The 2004 index was approximately half the earlier estimate.

### **Satellite Telemetry**

#### ***Telemetry Synopsis***

Nineteen black scoters (10 male, 9 female) were captured during winter 2003/2004 at three sites using float-supported mist nets in association with decoys. These markings augment a sample of 16 males and 1 female marked at Nelson Lagoon, Alaska, in spring 2003. Figure 2 summarizes movement patterns for all birds. Links to partner maps depicting movements of individual birds from each marking location can be found at [www.seaduckjv.org/ststoc.html](http://www.seaduckjv.org/ststoc.html).

In Alaska, Black Scoters are known to breed primarily in three major areas: Bristol Bay Lowlands, Yukon-Kuskokwim Delta, and Seward Peninsula. Individuals marked in this study migrated exclusively to the Yukon-Kuskokwim Delta and Bristol Bay Lowlands areas, suggesting that they do not associate with birds breeding on the Seward Peninsula. The wintering affiliation of the Seward Peninsula population remains unknown.

Cross-seasonal movements of individuals were varied; appearing to follow coastlines, overland routes or more direct offshore pathways. Birds favored near-shore waters of Bristol Bay and the Kuskokwim Shoals throughout the breeding and molting periods. Specifically, Kvichak Bay was utilized by individuals from each marking location from spring through autumn; suggesting that this is a critical area for non-breeding, staging and molting Pacific Black Scoters.

### ***Telemetry Results by Marking Site***

**Strait of Georgia, BC, Canada:** Researchers from the Canadian Wildlife Service and Simon Fraser University implanted five adult females in December 2003. One female died in January 2004 and the four surviving individuals remained near the capture location during the winter months until departing the area in early- to mid-April. All individuals migrated west into Alaska and staged at Kvichak Bay or Kamishak Bay, Alaska, prior to moving inland to locations on the Bristol Bay Lowlands. All females resided for a period suggestive (>50 days) of breeding activity. Females subsequently moved to Kvichak Bay, Alaska, presumably to molt.

**Kodiak Island, Alaska:** Researchers from the Alaska Dept. of Fish and Game marked eight adult individuals (4 males and 4 females) in Chiniak Bay with satellite transmitters in March 2004. Of these, two females died near the capture site within two weeks of surgery. The six surviving individuals remained in Chiniak Bay until departing the area in late-April or early-May. Birds subsequently moved to locations in Egigek Bay, Kvichak Bay or Kamishak Bay for the spring-staging period. Both females moved to inland locations on the Bristol Bay Lowlands, a known breeding area; one stayed for a period of time (May 13-July 30) suggestive of breeding activity. Additionally, one adult male moved inland near Lime Village for duration (May 21-June 12) suggestive of association with a nesting female. Suspected non-breeding individuals resided in near-shore waters of the Kuskokwim Shoals and Bristol Bay, Alaska, during the breeding period. Five individuals likely molted and are currently located in either Nushagak Bay or Kvichak Bay, Alaska. One adult male currently resides in Kamishak Bay, Alaska.

**Nelson Lagoon, Alaska:** In April 2003, researchers from USGS/Alaska Science Center implanted 17 individuals (16 males and 1 female) with satellite transmitters. Two birds likely died and one transmitter failed (no signal) within two weeks of capture. Two transmitters failed in December 2003 and January 2004 and one bird likely died in December 2003. All other transmitters failed in April or May 2004. All individuals remained in Alaska and migrated within a narrow range between the Yukon-Kuskokwim Delta and near-Aleutian Islands. Eight individuals (7 males and the single female) moved inland to 2 major breeding areas, the Yukon-Kuskokwim Delta and Bristol Bay Lowlands, Alaska, and remained for a period (males: 10-30 days; female: >50 days) suggestive of breeding activity. Mean arrival date of males to breeding locations was May 18. Suspected non-breeding individuals remained in coastal near-shore waters of the Kuskokwim Shoals, Kuskokwim Bay or Kvichak Bay, Alaska, throughout the breeding period. Birds likely molted along the Kuskokwim Shoals, Kvichak Bay or Nelson Lagoon, Alaska. Birds wintered in near-shore waters along the Alaska Peninsula and near-Aleutian Islands.

Six adult males were implanted, out of the intended 15 transmitters, in April 2004 by researchers from the USGS/Alaska Science Center. Because of difficulties capturing females, transmitters were deployed only in males following the proposed sex ratio of 2:1, to complement the effort in 2003. Five individuals departed Nelson Lagoon in late-May and moved to near-shore waters along southwestern coastal Alaska. One male remained in Nelson Lagoon from April to present. We suspect that all individuals were non-breeding, as they resided in near-shore waters of the Kuskokwim Shoals, Kvichak

Bay, or Nelson Lagoon, Alaska, throughout the breeding and molting periods. Two of the five individuals returned to and are currently in Nelson Lagoon, Alaska.

**Genetics**

Tissue samples were collected from all marked birds, plus others that were captured and released, and are currently stored at the USGS Molecular Ecology Laboratory in Alaska. Mitochondrial DNA primers are currently being developed (SDJV project# 40). Genetic analyses will be done after completion of this study and acquisition of samples from all study areas.

**Project Status:** We accomplished the objective of obtaining a precise population estimate for the survey area in 2004. No changes to the survey design are planned at this time. We will continue double sampling to obtain observer specific detection rates.

As of September 28, 2004, 16 individuals were transmitting good location information. We plan to continue implanting black scoters in Alaska (Yukon-Kuskokwim Delta, Kodiak Island) and British Columbia (Strait of Georgia) in 2005.

One of the original objectives in the proposal was to tap traditional knowledge about black scoter biology and harvest. Although we may continue to obtain information toward this objective opportunistically, the objective has been formally dropped due to significant political, bureaucratic, and financial obstacles. Local communities are kept abreast of this study through contacts with Refuge Information Technicians and distribution of a “Black Scoter Studies in Alaska” fact sheet.

**Project Funding Sources (US\$).**

SDJV (USFWS) Contribution	Other U.S. federal contributions	U.S. non-federal contributions	Canadian federal contributions	Canadian non-federal contributions	Source of funding (agency or organization)
68,850					
	5000				USFWS Bristol Bay / Kodiak EcoTeam
	45,900				USGS
	52,675				Alaska National Wildlife Refuges (USFWS)
	12,900				USFWS Migratory Bird Management - Alaska
				6000	Simon Fraser University
			6250		Canadian Wildlife Service
		10,300			Alaska Dept Fish&Game

**Total Expenditures by Category (US\$).** Complete only if project was funded by SDJV ; total dollar amounts should match those in previous table.

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
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<b>Banding</b>					
<b>Surveys</b>	<b>34,425</b>				
<b>Research</b>	<b>173,450</b>				
<b>Communication</b>					
<b>Coordination</b>					

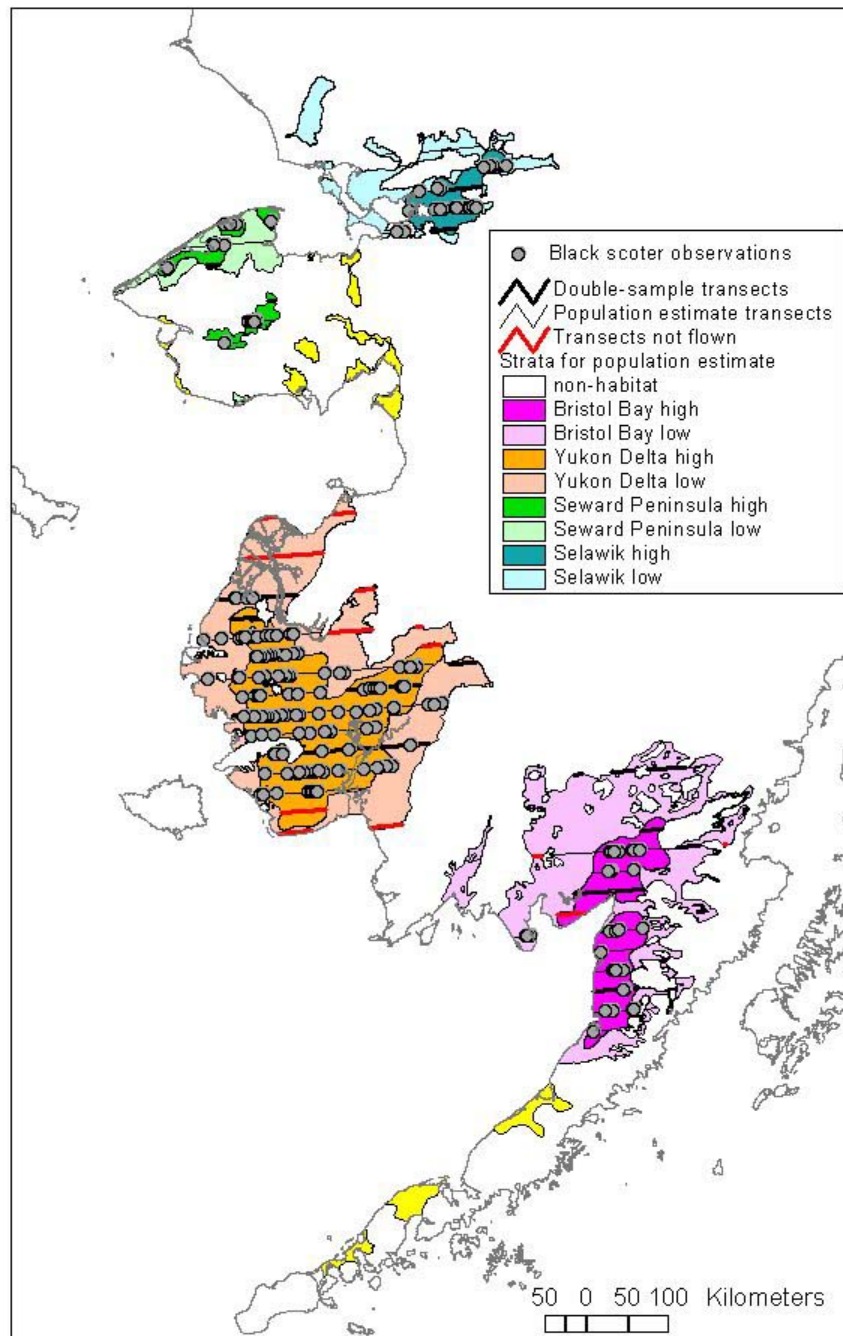


Fig. 1. Black scoter observations from aerial survey flown in western Alaska, June 2004. Yellow strata were not surveyed.

## --- Pacific Black Scoter Satellite Telemetry 2004 ---

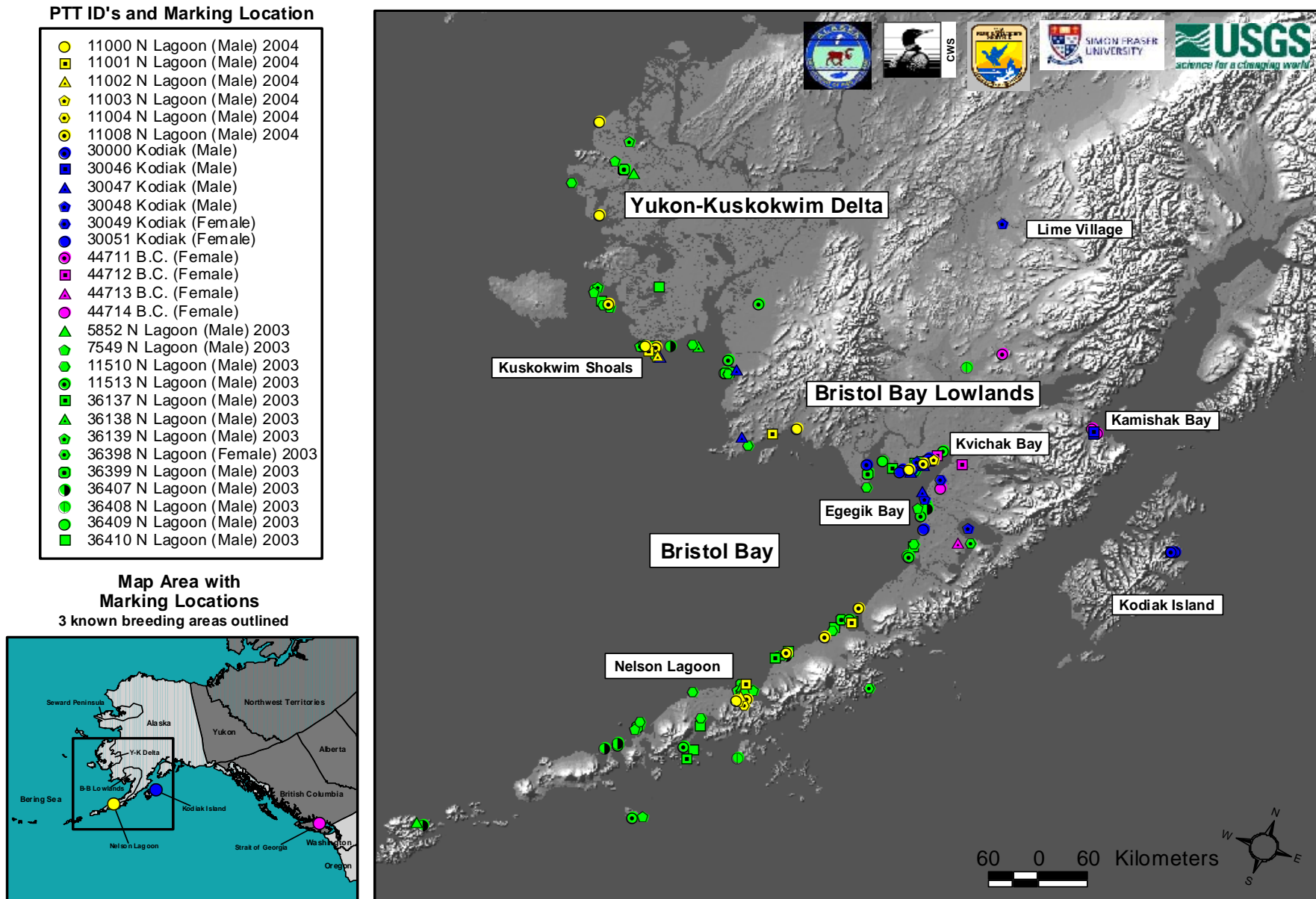


Figure 2. Summary map showing locations of black scoters marked with satellite transmitters in 2003-2004.