

Summary Report

AERIAL VIDEOGRAPHY OF BRANT COLONIES ON YUKON DELTA NWR IN 1999

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Aerial surveys at five black brant colonies on the Yukon-Kuskokwim Delta--Kokechik Bay (KB), Tutakoke River (TR), Kigigak Island (KI), Baird Inlet Island (BI), and a peninsula northwest of Baird Inlet Island (BP) were conducted from 16-18 June. Mechanical problems with the survey aircraft delayed the surveys by one week. Consequently, flying was completed at initiation of hatch and ground-truth transects to determine visibility correction factors were not searched. Good weather and lighting conditions allowed completion of survey flights in 3 days. Two Sony digital video camcorders sampled adjacent, non-overlapping transects from a Cessna-206 aircraft. Sampling protocol followed that of recent years. Systematically spaced flight lines were established perpendicular to the gradient of nesting densities, which generally also was perpendicular to coastlines. The Global Positioning System (GPS) receiver in the aircraft was interfaced with a laptop computer via the RS-232 ports to navigate along each transect by displaying the location of transects and the moving aircraft on the computer monitor. A GPS-linked, aircraft navigation and tracking computer program was used to record the track of the aircraft and boundaries of video transects. Surveys were made generally under thin clouds, which produced uniform brightness without shadows; however, some transects at KB and KI were conducted under sunny conditions. Transects were spaced at 200-350 m intervals

depending on the size of the colony. We flew at 122 m AGL at 113-145 km/hr over all colonies. Fifty-eight transects (traversing 56.6 km) were flown at KB; 60 (98.0 km), 48 (83.5 km), 26 (63.1 km), and 16 (67.3 km) were flown at TR, KI, BI, and BP, respectively. KB, TR, KI, BI, and BP required 1:33 (hours:minutes), 1:49, 1:25, 0:51, and 0:33, respectively, from start of first transect to end of last transect.

GPS locations of transects from the aircraft tracking files were plotted on digitized topographic maps with MIPS (Map and Image Processing System) geographical information system. Total area in each colony was determined with the planimeter function in MIPS from GPS locations recorded during flight. Area sampled by each transect was computed from UTM (Universal Transverse Mercator) locations recorded by the flight tracking program at 1-second intervals during the surveys.

Video scenes were viewed in freeze-frame mode on a 50-cm video monitor independently by two observers. Digitized images of known nests from previous years were displayed on a computer monitor as a reference to image scale and appearance of different species in the video images. Due to excellent lighting conditions and improved camera technology images were consistently good among all colonies. Transect number, time along transects (minutes, seconds, and video frame number), and nest-description codes were recorded on a spreadsheet in Windows, which allowed concurrent control of the digital camcorder. Images with brant nests were digitized instantaneously and saved to file for later inspection, using Sony's camera-computer interface. Duplicate digital tape editing machines allowed observers to process video tapes simultaneously. Good efficiency was achieved with a streamlined data entry format, new video editing equipment, and consistently high image quality.

The total of estimates from all colonies (14,359) was 70% of the mean total from 1992-1997 (20,418); numbers of nests were lower at KB, BI, and BP compared to 1998 (Table 1 and Figure 1). Furthermore, because the analysis used this year (Lincoln-Petersen) overestimates the number of nests compared to using correction factors from ground-truthing, the difference between the estimates this year and the average from previous years would probably be even greater if analyzed by the same method. Mean nest density was highest at TR (2.86 nests/ha) followed by KB (2.59), KI (2.33), BI (1.80), and BP (0.61). A primary factor contributing to lower densities than previous years was probably cold conditions late in spring, which delayed break-up by about 10 days. Additionally, increased predation by arctic foxes compared to recent years was reported by personnel at biological field camps. Human activity in the Baird Inlet and Kokechik Bay colonies appeared to have been greater than in past years, based on casual observation of footprints, which were not recorded from video this year or other years. In 1998 total number of nests also was lower than recent years because of flooding during incubation.

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Table 1. Estimates from videographic aerial surveys of brant nests at five colonies--Tutakoke River (TR), Kokechik Bay (KB), Baird Island (BI), Kigigak Island (KI), and Baird Peninsula (BP)--on Yukon Delta National Wildlife Refuge from 1992 to 1999.

COLONY	ANNUAL ESTIMATE							S.E.						
	1992	1993	1994	1995	1997 ²	1998 ²	1999 ¹	1992	1993	1994	1995	1997	1998	1999
TR	4,600 ²	4,937 ²	4,807 ¹	5,596 ²	4,588	3,448	4,100	202	190	400	297	554	292	96
KB	6,134 ²	4,667 ¹	6,978 ²	7,573 ²	9,144	5,655	4,072	295	577	196	351	1092	471	74
BI	3,258 ¹	4,156 ¹	4,461 ¹	4,720 ¹	1,944	2,747	1,777	347	357	454	474	242	264	80
KI	3,440 ¹	1,727 ²	2,260 ²	---	4,776	3,105	3,962	154	90	92	---	595	238	402
BP	2,157 ¹	614 ¹	2,441 ¹	2,591 ¹	2,259	1,431	448	151	77	142	184	282	169	81
TOTAL	19,589	16,101	20,947	22,740	22,711	16,386	14,359							

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¹ Estimates based on Lincoln-Petersen analysis of counts by two observers.

² Estimates based on correction factors from ground-truthed transects.

³ 1994 Kigigak Island estimate included in total.

Figure 1. Annual estimates of numbers of nests in five brant colonies on Yukon Delta National Wildlife Refuge from 1992-1999.