

Preliminary Report
August 29, 2001

AERIAL VIDEOGRAPHY OF BRANT COLONIES ON YUKON DELTA NWR IN 2001



R. Michael Anthony
Alaska Biological Science Center
USGS - Biological Resources Division
1011 East Tudor Road
Anchorage, Alaska 99503

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 15-16 June. Late breakup and nest initiation resulted in the latest start since the survey began. However, good weather and lighting conditions allowed completion of survey flights in two days. The Sony digital video camcorders sampled 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. An external Global Positioning System (GPS) receiver was interfaced with a laptop computer via the RS-232 ports to navigate along each transect by displaying the location of the transect 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 under thin clouds on the first day at KI, BI, and BP, which produced uniform brightness without shadows; the second day of the survey at KB and TR was 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 133-180 km/hr over all colonies. Fifty-seven transects (traversing 43.1 km) were flown at KB; 56 (88.6 km), 50 (80.1 km), 26 (62.6 km), and 16 (64.5 km) were flown at TR, KI, BI, and BP, respectively. KB, TR, KI, BI, and BP required 1:43 (hours:minutes), 1:33, 1:12, 0:46, and 0:28, respectively, from start of first transect to end of last transect. Ground-truthing searches were conducted at KB, TR, and KI.

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 61-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. Images were generally good among all colonies, but bright sunlight caused strong shadows and high contrast making images at KB and TR more difficult to view. 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. All images with nests of brant, cackling Canada geese, emperor geese, and eiders were digitized and saved to file, using Sony's camera-computer interface. Efficiency of processing video tapes was similar to previous years. One observer was the same as in 2000.

Observations by field crews in 2000 of large numbers of tundra voles (*Microtus oeconomus*) in all coastal habitats indicated the highest population in the last two decades. Fox productivity also was probably high in 2000, benefiting from the abundance of a primary prey. High losses of voles from summer flooding and a subsequent population crash created conditions that often precede high nest predation by foxes. Population estimates from video transects and ground-truthing at KB, TR, and KI corroborated reports from field camps that fox predation was extremely high in most nesting areas in 2001. At KB 52% of the 212 nests in the transects that we searched were destroyed. Mean clutch size in active nests at KB was 3.2 eggs. At TR 36% of 78 nests (>200 nests are usually found in the ground-truthed transects at TR) were found with down but no eggs. Many more uncounted nest bowls without down also were found. Mean clutch size of active nests at TR was 2.5, suggesting the occurrence of continuation clutches following predation of initial nests. At KI only 40 brant nests were found on transects and all were destroyed. Although BI escaped predation by foxes, eggging by humans reduced productivity. Estimate of total nests in all colonies was the lowest of any survey. The colony at

KB, which had the highest productivity among mainland colonies, may have suffered lower fox predation because of high hunting and trapping pressure due to its close proximity to the villages of Hooper Bay, Chevak, and Scammon Bay. Radio telemetry data from 1985-1987 indicated that this local population of foxes had high mortality rates due to humans.

Acknowledgments--Funding for this survey was provided by U.S. Fish and Wildlife Service, Migratory Bird Management, Region 7. Aircraft and logistic support were furnished by Yukon Delta National Wildlife Refuge. Paul Liedberg, Yukon Delta National Wildlife Refuge, piloted the aircraft again in 2001. Ericha Drenning and Pam Wolff, Alaska Biological Science Center, counted nests from video tapes and participated in ground-truthing.

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 1993 to 2001.

COLONY	ANNUAL ESTIMATE								S.E.							
	1993	1994	1995	1997 ²	1998 ²	1999 ¹	2000	2001 ²	1993	1994	1995	1997	1998	1999	2000	2001
TR	4,937 ²	4,807 ¹	5,596 ²	4,588	3,448	4,100	7,437 ²	1,212	190	400	297	554	292	96	584	73
KB	4,667 ¹	6,978 ²	7,573 ²	9,144	5,655	4,072	8,021 ²	3,677	577	196	351	1092	471	74	866	215
BI	4,156 ¹	4,461 ¹	4,720 ¹	1,944	2,747	1,777	4,088 ¹	3,604	357	454	474	242	264	80	324	198
KI	1,727 ²	2,260 ²	---	4,776	3,105	3,962	4,286 ¹	1,721	90	92	---	595	238	402	647	107
BP	614 ¹	2,441 ¹	2,591 ¹	2,259	1,431	448	1,962 ¹	421	77	142	184	282	169	81	142	36
TOTAL	16,101	20,947	22,740 ³	22,711	16,386	14,359	25,749	10,635								

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.

