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AERIAL VIDEOGRAPHY OF BRANT COLONIES ON YUKON DELTA NWR IN 2002

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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 5-6 June. Surveys were conducted earlier than the four previous years, but only slightly earlier in the nesting period due to earlier break-up this year. Two Sony digital video camcorders mounted vertically sampled non-overlapping transects through holes in the floor of a Cessna-206 aircraft. Sampling protocol followed that of recent years. Systematically spaced flight lines were established perpendicular to the gradients of nesting densities, which generally also were perpendicular to coastlines. An external Global Positioning System (GPS) receiver was interfaced with a laptop computer via the serial ports to record the location of transects and the moving aircraft on the computer monitor. Surveys were conducted under clear, sunny skies at all colonies, which resulted in high contrast images with strong shadows and poorer color saturation than under overcast skies. Transects were spaced at 200-350 m intervals depending on the size of the colony. We flew at 122 m AGL at 135-179 km/hr over all colonies. Sixty transects (traversing 45.6 km) were flown at KB; 59 (95.3 km), 48 (74.8 km), 26 (57.8 km), and 16 (90.1 km) were flown at TR, KI, BI, and BP, respectively. KB, TR, KI, BI, and BP required 1:40 (hours:minutes), 1:09, 1:09, 0:38, and 0:31,

respectively, from start of first transect to end of last transect. Ground-truthing searches were conducted at KB.

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 2-second intervals during the surveys.

Unlike previous years, when counts were made from images displayed directly from video tape to a monitor, this year images covering all transects were first digitized and stored in a computer with a MATLAB image-processing program for viewing on a 43-cm monitor. This process was done in conjunction with an associated study to automate detection of birds on nests. Digitized images of known nests from previous years and nests from the current year were displayed as background on the computer monitor as a reference to image scale and appearance of different postures of birds in the video images. Images were acceptable among all colonies, but bright sunlight caused strong shadows and high contrast making images at BI, KI, and BP more difficult to view. Transect number, image file name, time along transects (minutes, seconds, and video frame number), and nest-description codes were recorded automatically to file whenever an observer entered a nest-description code that indicated the presence of a nest. All image files with nests of brant, cackling Canada geese, emperor geese, and eiders were saved on compact disk. Processing time of transects was similar to previous years. Efficiency gained in automated entry of observation data and improved rate of viewing the digital images versus

direct viewing of the tapes as in previous years was lost in the time required to convert the video tapes to digital images.

This year reflected a more 'normal' nesting season with no known major disturbances (e.g., flooding, fox predation, El Niño, late break-up) among any of the colonies. The nest estimate at Kokechik Bay was below the five-year average (Table 1) and the number of nests found on ground-truthed transects in the same general area was much lower. The estimate at Baird Inlet Island also was down but not to the extent at Kokechik Bay. Both areas had numerous boot prints in the mud. Boot prints were observed 34 times in 16 of 60 transects at Kokechik Bay. At Baird Inlet Island boot prints were observed 138 times in 13 of 26 transects; this compares to 144 observations of boot prints in 2001 when egging was heavy. However, we did not observe the high number of unoccupied nests and nests with strewn down this year as compared to 2001, so it is uncertain that this was a major factor affecting the number of active nests. Baird Peninsula, which is about 5 km northwest of Baird Island had above average numbers of nests. Kigigak Island and Tutakoke River had numbers similar to the five-year average.

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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 1994 to 2002.

COLONY	ANNUAL ESTIMATE								S.E.							
	1994	1995	1997 [2]	1998 [2]	1999 [1]	2000	2001[2]	2002	1994	1995	1997	1998	1999	2000	2001	2002
TR	4,807 [1]	5,596 [2]	4,588	3,448	4,100	7,437 [2]	1,212	4,524	400	297	554	292	96	584	73	314
KB	6,978 [2]	7,573 [2]	9,144	5,655	4,072	8,021[2]	3,677	4,634	196	351	1092	471	74	866	215	362
BI	4,461 [1]	4,720 [1]	1,944	2,747	1,777	4,088[1]	3,604	3,052	454	474	242	264	80	324	198	199
KI	2,260 [2]	---	4,776	3,105	3,962	4,286 [1]	1,721	4,380	92	---	595	238	402	647	107	255
BP	2,441 [1]	2,591 [1]	2,259	1,431	448	1,962 [1]	421	2,708	142	184	282	169	81	142	36	147
TOTAL	20,947	22,740 [3]	22,711	16,386	14,359	25,749	10,635	19,298								

[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.