

July 16, 2003

AERIAL VIDEOGRAPHY OF BRANT COLONIES ON YUKON DELTA NWR IN 2003



R. Michael Anthony
Alaska Science Center
USGS – Biological Science Office
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 on 6 June. Surveys were conducted on the same date as last year, but earlier than the four previous years. Timing of surveys relative to incubation was later this year compared to 2002 due to an extremely early break-up. Two vertically-mounted Sony digital video camcorders (model VX-2000, recording in progressive scan mode) sampled non-overlapping transects through holes in the floor of a Cessna-206 aircraft. Sampling protocol was similar to that of recent years except systematically spaced flight lines were established along the long axis of all colonies. 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 high overcast at all colonies, which provided optimum lighting conditions. Transects were spaced at 200-350 m intervals depending on the size of the colony. We flew at 137 m AGL at 133-177 km/hr over all colonies. Fourteen transects (traversing 106.0 km) were flown at KB; 12 (82.6 km), 12 (77.8 km), 26 (60.3 km), and 16 (69.9 km) were flown at TR, KI, BI, and BP, respectively. KB, TR, KI, BI, and BP required 0:43 (hours:minutes), 0:31, 0:32, 0:46, and 0:38, respectively, from start of first transect to end of last transect. Ground-truthing searches were conducted at KB, KI, and TR.

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.

As in 2002, this year images covering all transects were first digitized and stored in a computer for viewing with a MATLAB image-processing program 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. Due to the excellent lighting conditions and improved camera technology, images were the best since surveys began in 1992. By comparison,

images recorded during a second flight to record vegetation at Kokechik Bay on 14 June under bright sunlight had high contrast and poor color. 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 manually entered time-of-day and a nest-description code that indicated the presence of a nest. All image files with nests of brant, cackling Canada geese, emperor geese, white-fronted 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. However, efficiency in post processing of images was greatly improved by using digitized images.

Nest predation by arctic foxes was severe throughout the coastal region this year, as it was in 2001. Except on Baird Island, which has little or no suitable fox habitat, ground-truthing confirmed high levels of nest destruction observed in video images. The nest estimate at Kokechik Bay was the lowest since the surveys began (Table 1) and the number of nests found on ground-truthed transects confirmed the severe decline in number of nests. Only at Baird Inlet Island was the estimate similar to 2002. Both areas had numerous boot prints in the mud. Boot prints were observed 160 times in 12 of 14 transects at Kokechik Bay, which was up from 34 prints in 2002. Also, all-terrain vehicle (ATV) and snow machine tracks were observed in the brant nesting area for the first time since the survey began. No active nests and only 18 destroyed nests were found along 3.7 km of ground-truthed transects at Kokechik Bay, suggesting that very few brant even initiated nests. At Baird Inlet Island boot prints were

observed 70 times in 19 of 26 transects, compared to 144 observations of boot prints in 2001 when eggging was heavy. At Tutakoke River only 6 active nests were observed on the portion of transects south of the Tutakoke River while 61 of 147 (41%) unoccupied nests were observed in this area. Baird Peninsula, which is about 5 km northwest of Baird Island had lowest number of nests. Kigigak Island had more active nests than all other colonies except Baird Island, but predation there resulted in a population estimate lower than the five-year average.

Acknowledgments-- Funding for this survey was provided by U.S. Fish and Wildlife Service, Migratory Bird Management Office, 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 2003. Yvette Gillies, Alaska Science Center, processed video tapes, counted nests, assisted the pilot in navigating during surveys, 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 1995 to 2003.

COLONY	ANNUAL ESTIMATE								S.E.							
	1995	1997 ²	1998 ²	1999 ¹	2000	2001 ²	2002 ²	2003 ²	1995	1997	1998	1999	2000	2001	2002	2003
TR	5,596 ²	4,588	3,448	4,100	7,437 ²	1,212	4,524	1,622	297	554	292	96	584	73	314	79
KB	7,573 ²	9,144	5,655	4,072	8,021 ²	3,677	4,634	655	351	1092	471	74	866	215	362	52
BI	4,720 ¹	1,944	2,747	1,777	4,088 ¹	3,604	3,052	3,202	474	242	264	80	324	198	199	135
KI	---	4,776	3,105	3,962	4,286 ¹	1,721	4,380	2,474	---	595	238	402	647	107	255	118
BP	2,591 ¹	2,259	1,431	448	1,962 ¹	421	2,708	547	184	282	169	81	142	36	147	46
TOTAL	22,740 ³	22,711	16,386	14,359	25,749	10,635	19,298	8,500								

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

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