Teshekpuk Lake Area Molting Goose Survey, 2014

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ABSTRACT This report summarizes the 33rd annual Teshekpuk Lake Molting Goose Survey, conducted on the Arctic Coastal Plain of Alaska, on 20, 22, and 24 July 2014. Area-wide counts of all adult geese, Pacific brant (BLBR), greater white-fronted geese (GWFG), and snow geese (SNGO) decreased relative to the previous year. Only GWFG gosling counts increased from the previous year. Counts for adults of these species (and goslings) were as follows; BLBR 12,114 (337), CAGO 11,023 (631), GWFG 34,199 (15,112), and SNGO 7,643 (238). Totals of tundra swans and (cygnets) were 232 (31). The count of snowy owls throughout all areas surveyed in 2014 was 28 (25 in Teshekpuk, 3 in Piasuk/Cape Simpson). Long-term growth rates for brant and Canada geese in the Teshekpuk Traditional Survey Area are relatively flat (<1%/yr; 1982-2014), with more recent years showing a decreasing trend for both species (-11%/yr, 2011-2014). Meanwhile, greater white-fronted geese and snow geese have increased by 10 and 16%, respectively over the long-term (1982-2014) and 10 and 19%/yr, over recent years (2011-2014). We conducted 'Additional Area' surveys at Cape Simpson and the Piasuk River Delta in 2014. The total count for adult Pacific brant observed in additional areas was 10,356, representing 46% of all molting brant counted between the Teshekpuk Traditional and additional survey areas.

KEY WORDS: aerial survey, molting geese, Teshekpuk Lake, National Petroleum Reserve *December 2015*

This report summarizes results from the 2014 Teshekpuk Lake Molting Goose Surveys. The Teshekpuk survey was initiated in 1976, repeated in 1977-78, and has been conducted annually since 1982, with the goal of monitoring abundance and distribution of molting geese that use the area north and east of Teshekpuk Lake, located on the Arctic Coastal Plain (ACP) of Alaska. The significance of this area to molting geese was first documented by Henry (Hank) Hansen and Jim King in 1957 (King 1970). Past and current surveys have reported large concentrations of molting Pacific black brant (*Branta bernicla nigricans*), Canada geese (*Branta canadensis*), greater white-fronted geese (*Anser albifrons frontalis*), and lesser snow geese (*Anser caerulescens*) in the area. This survey documents abundance and distribution of molting geese during mid-July, the peak of the molting period, along the Arctic Coastal Plain (King 1970, Derksen et al. 1979, 1981, King and Hodges 1979, Flint et al. 2007). The distribution of geese before and after the peak molting period may be different than the distribution during the survey. Furthermore, goose distribution during the survey period (mid July 1976-2013) has changed over time (Flint et al. 2007). Therefore, data collected during this survey should be used only to determine general trends (with limited temporal extent) of goose distribution during the peak molt, and should not be the sole source to determine goose distribution throughout the molt cycle in the area north and east of Teshekpuk Lake. Several additional molting areas outside of the traditional Teshekpuk survey area were identified during a study conducted by the USGS Alaska Science Center (Lewis et al. 2009). All five of these "additional" molting areas were surveyed in 2010, and two (Cape Simpson and the Piasuk River Delta) have been flown each year since 2010 (Mallek 2011, Wilson et al. 2014).

STUDY AREA AND METHODS

Teshekpuk Lake Traditional Survey Area

The Teshekpuk Traditional Survey Area includes approximately 197 lakes and several bay, shoreline, and creek segments located north and east of Teshekpuk Lake (Fig. 1). Each lake is identified by a unique number. Observations of geese, swans, and loons are recorded for each lake. In 2014, the survey was flown in a Cessna 206 amphibious-equipped aircraft (N9623R). Dates and crew in 2014 were 20, 22, and 24 July (Appendix 1), pilot-observer H. Wilson and right-front observer B. Shults. The surveys were flown at 45-60 meters (150-200 feet) above ground level and at airspeeds of 130-190 kilometers per hour (80-110 knots). Aircraft navigation on survey was accomplished using an aerial photograph paper map with printed numbers as lake identifiers, electronic moving maps on GPS and/or ipad units, and/or a remote computer screen running a moving map program developed by John Hodges (USFWS MBM). The aircraft flight path was recorded by a laptop computer connected to the aircraft GPS. Shorelines of large lakes were flown so that feeding or loafing geese on land would be recorded.

Figure 1. The Teshekpuk Traditional Survey Area for molting geese, including approximately 197 lakes and several bay, shoreline, and creek segments located north and east of Teshekpuk Lake.

Surfaces of large lakes were also flown in a systematic fashion to provide complete coverage of each lake. Smaller lakes were flown such that the flight path over the lake provided an unrestricted view of the entire lake and shoreline. Observations were recorded via a remote microphone (as sound files) using a program ('Record') developed by John Hodges. A second computer program, ('Transcribe' also developed by John Hodges), was used later to replay sound files and transcribe data to text files. The transcribed text files were then used for data analyses.

Additional Survey Areas

In 2014, surveys were flown in two of the five additional areas identified by USGS Alaska Science Center (ASC) as important brant molting areas; Piasuk River Delta and Cape Simpson (Fig. 2). These additional areas were identified during a study conducted by the USGS ASC using intensive aerial surveys and telemetry of Pacific brant (Lewis et al. 2009). Although previous surveys at Cape Simpson and Piasuk (2010-2013) achieved relatively consistent coverage, annual variation in flight paths warranted formalization of survey design in these areas.

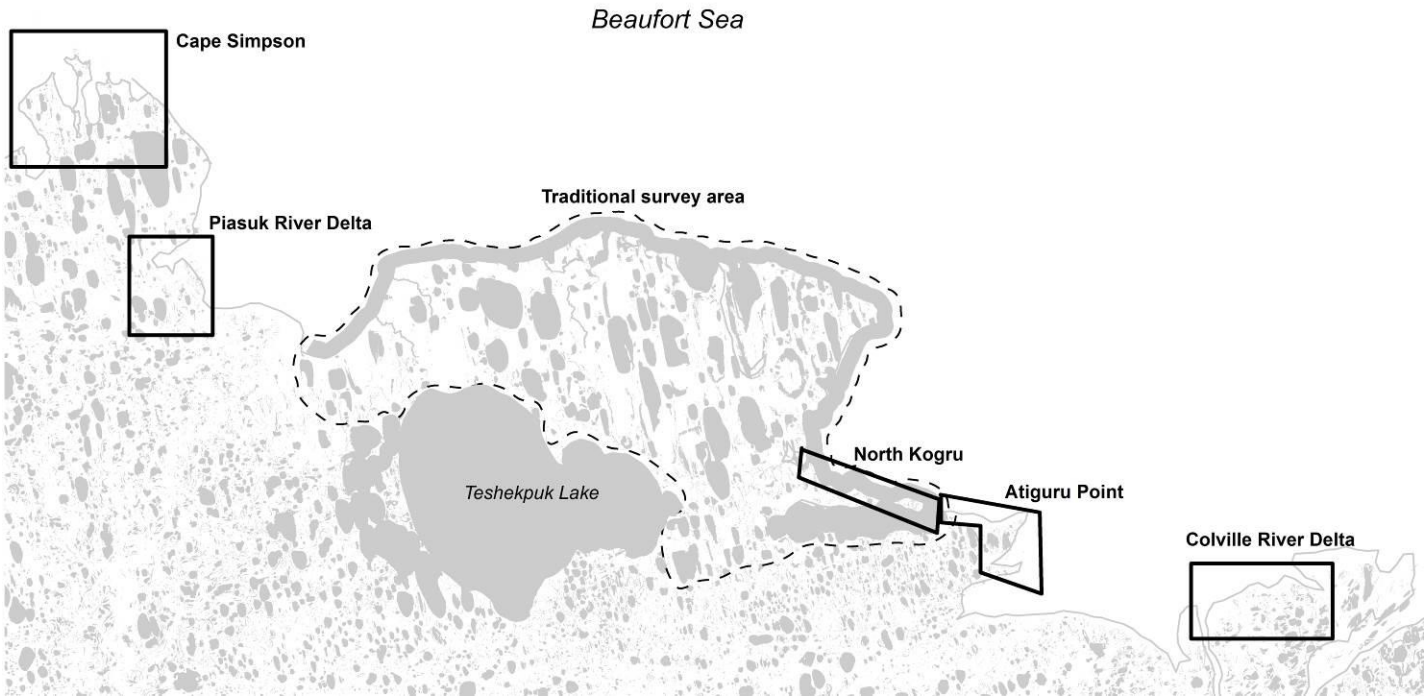

Figure 2. Additional survey areas (solid-framed polygons) identified by USGS Alaska Science Center (ASC) as important brant molting areas based on radio telemetry data (Lewis et al. 2009, 2011, Flint et al. 2014). Additional areas; Cape Simpson, Piasuk River Delta, North Kogru Coast, Atigaru Point (and Eskimo Islands), and Colville River Delta, are shown in relation to the Traditional Teshekpuk Survey Area (broken outline).

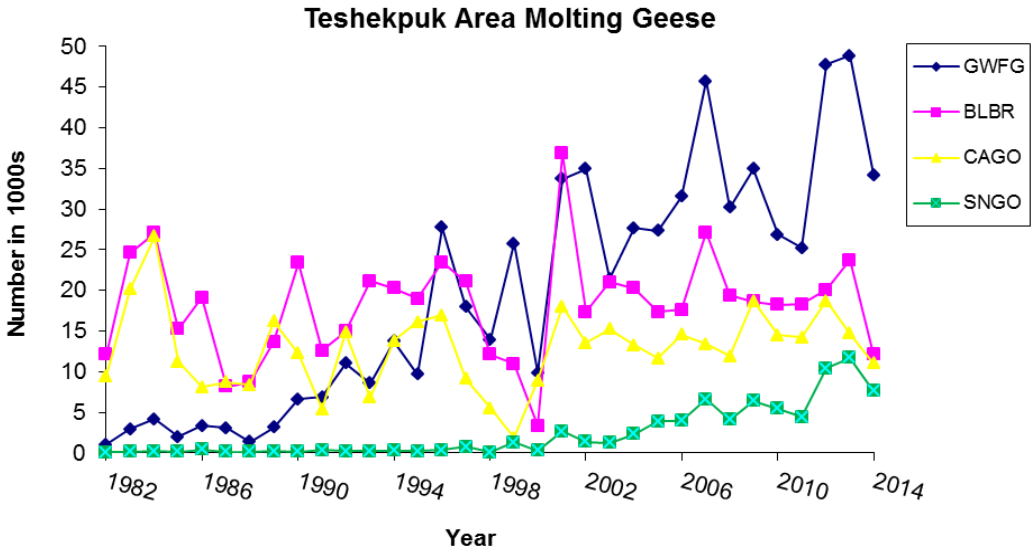

Figure 3. Observations of molting adult geese on the Teshekpuk Traditional Area Survey (1982-2014). BLBR = Black Brant, CAGO = Canada goose, GWFG = Greater white-fronted goose, and SNGO = Snow goose.

In 2014, updated survey designs for these areas were developed (Appendix 2) which tightened boundaries for each sampling area, assigned lake numbers to large discrete lakes, and established transect lines where appropriate (i.e., in complex wetlands such as Piasuk). We flew the updated survey design for these additional areas in 2014, recording observations according to assigned transects, lakes, and subsections. Aircraft speeds, altitude, and navigation, as well as data recording techniques, were identical to the techniques used in the traditional survey area.

RESULTS

Summary observation totals for geese and goslings in the Teshekpuk Traditional Survey Area, as well as the Cape Simpson and Piasuk River Delta additional areas are provided in Table 1. Figure 3 illustrates the number of adult geese counted from 1981-2014 at the Teshekpuk Traditional Survey Area by species. Observation totals for loons, geese, and swans, by lake, at the Teshekpuk Traditional Survey Area are provided in Appendix 3.

Teshekpuk Traditional Survey Area

The 2014 survey was conducted over three days, 20, 22, and 24 July (see Appendix 1). Totals of 64,979 adult geese and 16,318 goslings were observed. Pacific brant accounted for 18% of the adult geese observed (12,114 adults and 337 goslings), while white-fronted geese accounted for 53% (34,199 adults and 15,112 goslings). Canada goose totals were 11,023 adults and 631 goslings, accounting for 17% of the geese observed. Lesser snow geese accounted for 12% of the adult geese observed (7,643 adults and 238 goslings). Tundra swan totals were 232 adults and 31 cygnets. Pacific loon, red-throated loon, and yellow-billed loon totals were 96, 7, and 1, respectively. 2014 observation totals for geese, swans, and loons, by individual lake, are provided in Appendix 3.

Additional Survey Areas (Piasuk and Simpson)

The Piasuk River Delta and Cape Simpson additional survey areas were flown on 24 July 2014 with totals of 22,071 adult geese and 3,227 goslings observed. Pacific brant totals were 10,356 adults with 216 goslings. A larger number of Pacific brant were recorded in the Cape Simpson area (6,796; 66%), than the Piasuk River Delta (3,560; 34%) in 2014. White-fronted geese, Canada geese, and lesser snow geese adults and (goslings) at Cape Simpson and the Piasuk River were 6,273 (2,907), 413 (0), and 5,029 (1,044) respectively. 2014 observation totals for geese in the additional areas are provided in Table 1.

DISCUSSION

Teshekpuk Traditional Survey Area

Counts for all adult goose species were lower in 2014 than the previous year. However, gosling counts were higher, with the exception of brant. Gosling counts may be a useful index of production and population trend for the ACP. I hypothesize that declines in counts of adult geese (relatively uniform across all species) during the 2014 survey may have been related to delays in survey timing juxtaposed to an earlier than normal break-up, and thus, earlier nesting and molting phenology. In other words, the 2014 Teshekpuk survey was likely late relative to an early nesting year, and therefore some birds had already completed molting and departed prior to or during the survey. Typically, the Teshekpuk survey has been conducted between 16-18 July, while the 2014 survey did not commence until 20-24 July, due to weather delays. Also, supporting this explanation were observations of large flocks of flighted brant in the Cape Simpson area.

An alternative hypothesis for the high counts of goslings coupled with lower counts of adults in 2014, may be that successful breeding in areas away from the ACP resulted in fewer failed-breeding molt-migrants at Teshekpuk. Given 2014 was a relatively good nesting year for geese on the Yukon Kuskokwim Delta (Wilson 2014, Fischer and Stehn 2015), as well as the ACP (USFWS unpubl. data), counts at Teshekpuk in 2014 may have represented predominately local breeders, without the addition of failed-breeding migrant adults from other areas.

Pacific Brant

The importance of the Teshekpuk survey area to molting Pacific brant is well documented (King 1970, King and Hodges 1979, Mallek 2011, Flint et al. 2007, 2014, Lewis et al. 2009). Although the 2011-13 counts of adult Pacific brant showed an increase in this area (2011 – 18,300, 2012 – 20,090, 2013 – 23,725), the 2014 count (12,114) marked a substantial decline (-49% from the previous year), while goslings counts in 2014 showed only a slight reduction (-10%) from the previous year (376 in 2013 vs. 337 in 2014). Overall, the long-term growth rate indicates a relatively flat trajectory for brant observed in the Teshekpuk Traditional Survey Area (<1%/yr; 1982-2014). In 2014, approximately 7% of the total Pacific flyway mid-winter

population index (MWI; 3-yr average as of 2014; Pacific Flyway Databook 2014) were observed in the survey area.

Although the Teshekpuk Area Molting Goose Survey clearly shows the importance of this area to brant, the annual indices cannot be used to estimate the proportion of the Pacific flyway population that uses this area *throughout their life*. Some brant may use this area only once in their lifetime (e.g., as a second-year bird), other brant may molt here occasionally (e.g., after nest failure), and some brant may use this area many times (e.g., local breeders, or adult non-breeder; Bollinger and Derksen 1996). Therefore, the number or proportion of the population of brant that use this area in a specific year or averaged over multiple years is likely a biased indicator (low) of the overall use of this area by the Pacific flyway population.

Canada Geese

Use of the survey area by molting Canada geese is highly variable (Fig. 3) and appears to correspond to use by Pacific brant. The 2014 count of adults and goslings (in parentheses) for Canada geese, 11,023 (631), indicated a 25% decline in adults in 2014 and a 135% increase in goslings relative to the previous year. The long-term growth rate for Canada geese observed in the Teshekpuk Traditional Survey Area is nearly identical to that of brant, indicating a relatively flat trajectory of <1%/yr (1982-2014).

White-fronted Geese

Molting white-fronted geese observed on the Teshekpuk Survey are believed to nest on the Arctic Coastal Plain of Alaska (ACP). Although the estimated population of breeding white-fronted geese on the ACP has significantly grown over the last three decades (Stehn et al. 2013; 4%/yr, Amundson et al. *in prep*; 7.4%/yr), the molting population as estimated in the Teshekpuk Lake Traditional Survey Area has had substantially more growth (Fig. 4; approx. 11%/yr). As with most of the other goose species in 2014, counts of adult white-fronted geese were substantially lower (-30%) relative to the previous year, while gosling counts continued to increase in 2014 (Table 1).

Table 1. Summary observations of adult geese and goslings at the Teshekpuk Traditional Survey Area, and additional survey areas (Piasuk River Delta and Cape Simpson), 2011-2014. BLBR = Black Brant, CAGO = Canada goose, GWFG = Greater white-fronted goose, and SNGO = Snow goose.

Location	Year	BLBR	BLBR goslings	CAGO	CAGO goslings	GWFG	GWFG goslings	SNGO	SNGO goslings
Teshekpuk	2011	18,300	260	14,208	3	25,225	6,747	4,427	665
	2012	20,090	1,058	18,729	27	47,805	8,770	10,408	618
	2013	23,725	376	14,708	268	48,850	11,443	11,731	50
	2014	**12,114**	**337**	**11,023**	**631**	**34,199**	**15,112**	**7,643**	**238**
Piasuk River Delta	2011	2,705	0	12	5	17	0	1,337	1,336
	2012	3,733	0	0	0	245	8	3,348	3,348
	2013	7,742	0	60	15	792	291	7,405	7,405
	2014	**3,560**	**10**	**43**	**0**	**705**	**663**	**3,383**	**90**
Cape Simpson	2011	5,095	30	732	10	2,115	663	866	863
	2012	7,336	71	1207	38	2,786	1024	664	664
	2013	8,194	0	444	5	3,631	596	1,440	1,440
	2014	**6,796**	**206**	**370**	**0**	**5,568**	**2,244**	**1,646**	**14**

Snow Geese

Use of the Teshekpuk Traditional Survey Area by snow geese is relatively low compared to other species of geese (only 12% of the total). However, use of the survey area by snow geese has increased the most dramatically of all the species during more recent surveys (19%/yr 2011-2014, vs. 10%/yr for greater white fronted geese, and -10%/yr for Canada and brant geese).

Additional Survey Areas

In an initial effort to evaluate brant population sizes and use of areas outside the Teshekpuk Traditional Survey Area (Flint et al. 2007), five additional survey areas were flown in 2010 (Mallek 2011). Only two of these areas (Cape Simpson and the Piasuk River Delta) contained densities of molting brant which warranted surveying on an annual basis thereafter. The additional three, lower density, locations were slated to be flown on a 5-year rotation.

In 2010, 5,530 brant (adults + goslings) were observed at Cape Simpson and 5,141 (adults + goslings) at the Piasuk River. By 2013 there were ~2,600 more brant at each of these locations (2,664 and 2,601, respectively). Although the 2014 counts at these locations were lower than the previous year, they still represent a substantial increase from the earlier (2011) counts (30% increase for brant, and 72% for greater white-fronted geese, and 80-150% increase for snow geese).

While it is apparent that these areas are of significant value to Pacific Flyway brant, historical information suggests they were relatively unused prior to the 1990's (Ritchie et al. 2013, J. King pers. comm. in Flint et al. 2014). In contrast, recent data indicate molting brant are increasing in these areas, as well as in areas farther to the west (Ritchie et al. 2013, Wilson 2014, Flint et al. 2014, Tape et al. 2014). Birds utilizing the Cape Simpson and Piasuk areas are known to move between these "additional" areas and the Teshekpuk Traditional Survey Area (Flint et al. 2014), likely taking advantage of newly available habitat (Tape et al. 2014). It is unknown what other areas, currently unsurveyed, may be of increasing importance to molting brant across the ACP. Radio telemetry flights along the coast from Prudhoe Bay to Teshekpuk in 2008 did not detect molting brant east of the Colville River Delta (P. Flint, pers. comm.). However, regular surveys conducted west of the Piasuk River Delta (ABR Inc.) indicate increasing numbers of molting/brood-rearing brant (Ritchie et al. 2013). Gaining a clearer understanding of the distribution and abundance of molting brant across the ACP would be useful in modeling the overall population dynamics of Pacific brant. In working towards this goal, we suggest further research, marking, continued annual monitoring, and the development of a broader survey plan which would incorporate data from multiple western ACP aerial surveys (e.g., Ritchie et al. 2013, this survey) and include implementation of expanded, intermittent surveys across the ACP.

CONCLUSION

The importance of the Teshekpuk Lake survey area to molting geese has been well documented, and has been one of the primary justifications for protection of the area from oil development (U.S. BLM 2008, 2013). From 1998 to 2008, no leasing was considered in the Teshekpuk Special Use Area (TLSA), in part, due to the sensitivity of molting brant in the area. In 2008, a new Record of Decision by BLM stated the area was intended for leasing, with a 10-yr delay (U.S. BLM 2008). Under this regime, lease sales would be allowed starting in 2018. In 2013, a new Record of Decision returned the status to no leasing, with a concurrent moratorium on non-safety related infrastructure (U.S. BLM 2013). Molting geese are highly susceptible to disturbance (Derksen et al. 1992), and in some years molting habitat provided by the TLSA is extremely important to the global population of Pacific brant. Continued protection of this area is clearly warranted.

Data collected from the additional survey areas, specifically Cape Simpson and the Piasuk River Delta, indicate that these areas are also of high value to molting Pacific brant. Accordingly, the 2013 Record of Decision by the BLM also changed the status of the Piasuk and Cape Simpson areas to "no leasing", although infrastructure was deemed allowable (U.S. BLM 2013). Continued protection of these additional areas (and possibly others) should be reviewed as annual monitoring continues and expanded surveys are developed.

ACKNOWLEDGEMENTS

Funding for this survey was provided by the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM). I thank Brad Shults for serving as my right seat observer in 2015, and Kanuti NWR and Gates of the Arctic NP (Bettles bunkhouse), as well as USGS Alaska Science Center and Olgoonik LLC (at Lonely) for their assistance with lodging and remote field logistics. I also recognize Hank Hanson and Jim King (both USFWS-retired) for first documenting the importance of the Teshekpuk Lake

area to waterfowl and Rod King-USFWS-MBM Fairbanks retired; (1982-1999) and Ed Mallek-USFWS-MBM Fairbanks (2000-2013), and their observers, for collecting the majority of the historical data. Bob Platte (MBM-Anchorage) prepared initial graphics in this report and provided invaluable assistance in upgrading the additional area survey design. Michael Swaim also assisted with maps.

Data and conclusions presented in this report are preliminary and are not for publication or citation in published manuscripts without the permission from the authors. The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

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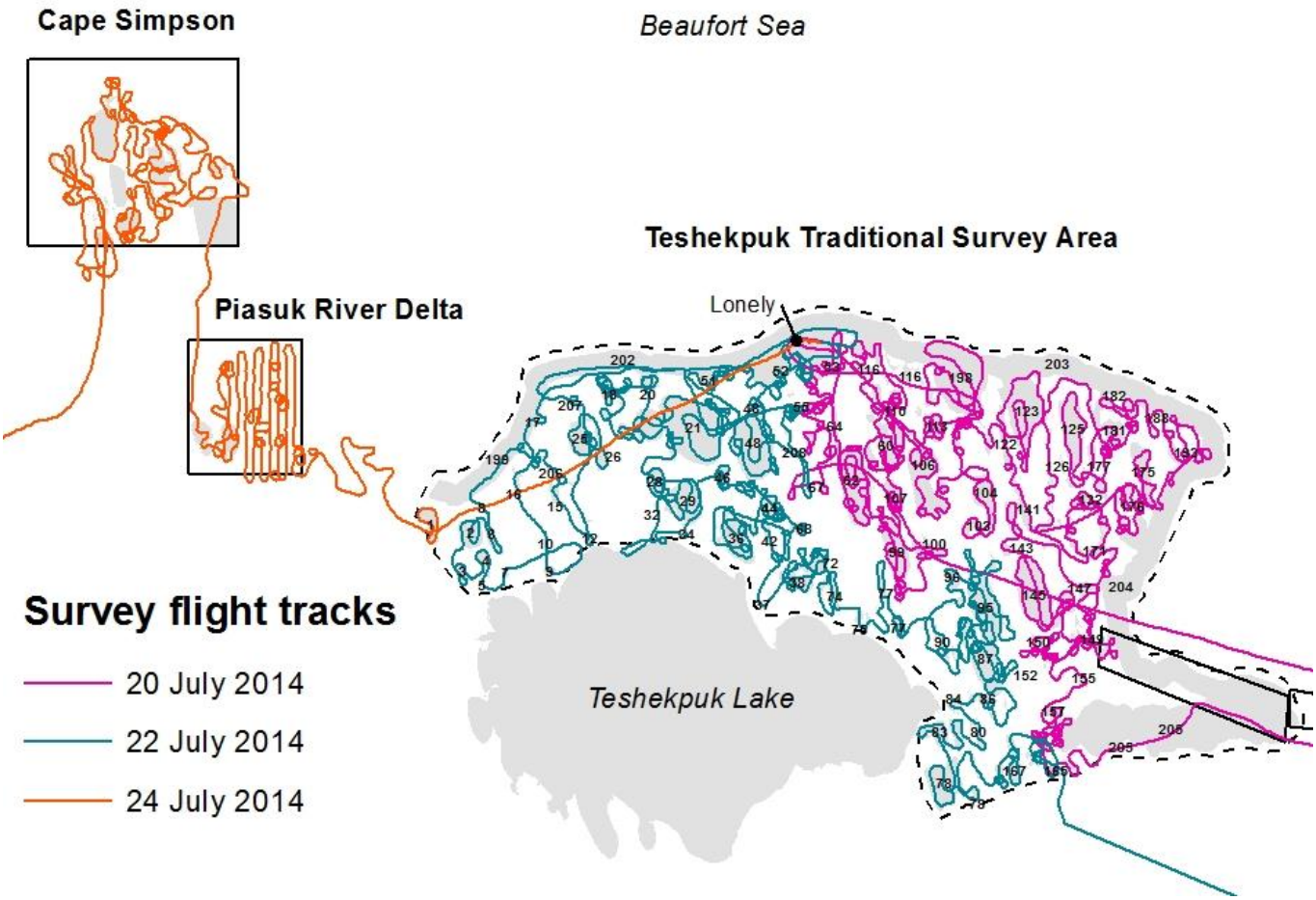
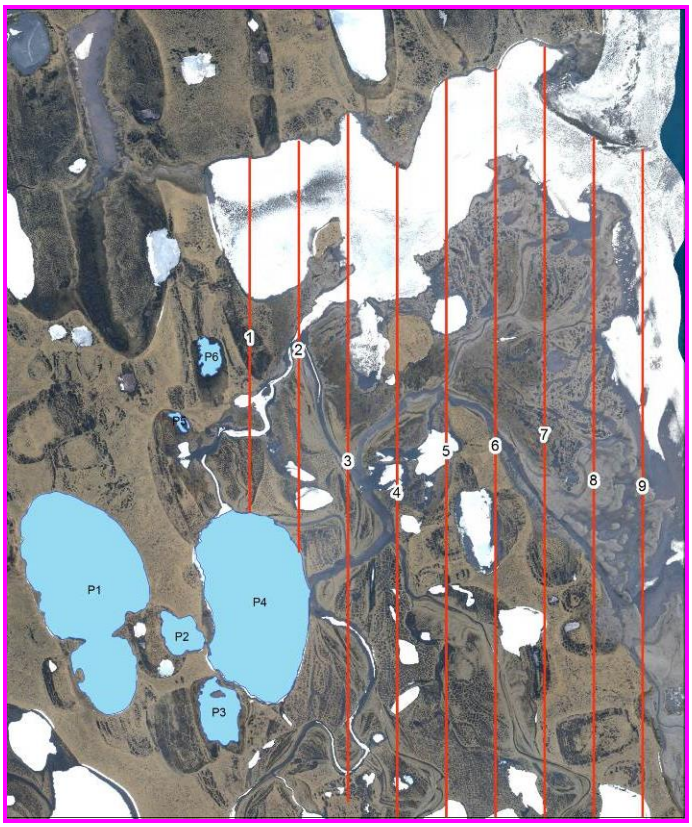
Appendix 1. Survey flight tracks for the Teshekpuk Traditional Survey Area on July 20 (magenta track) and July 22 (teal track), and the Piasuk River Delta and Cape Simpson additional areas on July 24 (orange track) Lakes are denoted in grey and survey lakes are individually numbered. Daily flight times were as follows: July 20 (7.8 total hrs: 5.8 hrs surveying with a refuel at Lonely, + 2 hrs round trip Deadhorse), July 22 (7 total hrs: 1 hr Deadhorse to Teshekpuk, 6 hrs surveying with refuel + overnight at Lonely), July 24 (5.6 total hrs: 3 hrs surveying Piasuk and Cape Simpson, then 2.6 hrs transit to Atqasuk (refuel) and on to Deadhorse).



Appendix 2. Updated survey design for the Cape Simpson and Piasuk River Delta 'additional areas' including numbered lakes (blue), transects (red), and discrete study area boundaries (magenta).

Cape Simpson



Piasuk River Delta

Appendix 3. Observations of geese, swans, and loons by lake from Teshekpuk Lake are molting goose survey 2014.

LAKE No.	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Total
1					12	15					2	2		31
2					254	36	1				1			292
3					196	116	2				2			316
4					53	40	1		1					95
5					62	44					2			108
6							2							2
7					3		2				1			6
8					137	75	3				13	8		236
9					10	20								30
10														0
11											2			2
12														0
13					35						1			36
14							3				2			5
15			50		61	5								116
16														0
17					22	38	2				4	4		70
18	3		367	10	431	6			385					1202
19					104	78	1							183
20			15		126	362								503
21			155		1791	394	3		1211		8			3562
22					21						2			23
23					52	3			3		2			60
24					383	53								436
25			83	5	277	93			19		5			482
26					65		1							66
27					31	14	1				2			48
28			23		775	117					5	3		923
29			60		84	40		2			1			187
30	4	12	24		30								1	71
31					152	36								188
32							3				2			5
33					63	127								190
34														0
35											2	2		4
36	42	6	81		305	106	1							541
37					16									16
38			60		304	211			36	23	3			637
39			41		248	49								338
40			30		505	102	5		760		2			1404
41														0
42					14	30								44
43	6	6			211	30					2			255
44			130		627	381			23		2			1163
45					23	45	2							70
46	10		51		53	8			159		1			282
47			18		67	16			220					321
48	30		58	5	931	120		1	566	30	4			1745
49														
50					2						2	2		6
51	29	40			435	293			10	15				822
52	82	50	60	80	604	1276			44	10				2206

BLBR = brant, BLBRB = brant gosling, CAGO = Canada goose, CAGOB = Canada goose gosling, GWFG = white-fronted goose, GWFGB = white-fronted goose gosling, PALO = Pacific loon, RTLO = red-thoated loon, SNGO = snow goose, SNGOB = snow goose gosling, SWAN = tundra swan, SWANC = tundra swan cygnet, YBLO = yellow-billed loon.

Appendix 3 (continued). Observations of geese, swans, and loons by lake from Teshekpuk Lake are molting goose survey 2014.

LAKE No.	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Total
53	301	6			544	1831					7			2689
54			222		474	35			329					1060
55	555		590	95	567	731					3			2541
56			10		40		1				4			55
57					150	70								220
58					75		1				10			86
59	Not surveyed. Lake has been dried up for several years.													-
60	7	3	432		337	30			7					816
61	120		80		794	10			105					1109
62	65		516	10	426	244			50		4			1315
63					30									30
64														0
65					18									18
66			5		272	210					2			489
67			30		97			2						129
68					254									254
69					72									72
70					279	66								345
71					2						2	2		6
72			45		304	243	2		22	15				631
73					30	16								46
74			30		118	67			169	10				394
75					12	7	1							20
76					65									65
77					173	45	5				4			227
78					360	332	2				12	3		709
79											4			4
80					220	35	1				6			262
81					6	10					1			17
82											4			4
83					65	160					16			241
84					82						1			83
85							1							1
86					45		2							47
87			616	260	1058	901	2		271	3	2			3113
88														0
89					101	30	1							132
90					162				10					172
91					40	16								56
92											2			2
93					70									70
94							1				2			3
95			320	10	560	484	1		86	12	2			1475
96					76	8			8		1			93
97					8	32								40
98			12		138									150
99	102		781	56	1150	23			20		2			2134
100					265	102								367
101			25	30	320	10								385
102					45									45
103														0
104	100		45		814	51			270					1280

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Appendix 3 (continued). Observations of geese, swans, and loons by lake from Teshekpuk Lake are molting goose survey 2014.

LAKE No.	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Total
105	70				706	15								791
106	1310		53		184	2			30					1579
107	625		201		672	6			8					1512
108					72	48								120
109			36		50				30					116
110	65		520		399	6			35		2			1027
111														0
112			71		240				20					331
113	155		130		150	10			10					455
114											2			2
115			2248		80	50			2					2380
116	100		10		185	261								556
117					20	50								70
118	700	15	480	10	96	90			7					1398
119														0
120														0
121	50		25		60	30								165
122			14		67									81
123	155		87		91	40								373
124														0
125			9		340	47					4			400
126														0
127														0
128	95	72	122		13	20					1			323
129									2		2	2		6
130														0
131														0
132	767	5	90		234	158								1254
133			50		302	317								669
134														0
135					9	20								29
136														0
137														0
138														0
139														0
140					170									170
141	290		30		286	45								651
142	180				202	6			15					403
143					40									40
144					298	40	2							340
145	105		237		1104	263	1		253		2			1965
146					18	12					2			32
147					55		8							63
148							10							10
149	2095	2	45		590	975			697	17				4421
150			60		50				89		1			200
151														0
152					158	49			18		2			227
153														0
154									75					75
155														0
156					10	12					1			23

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Appendix 3 (continued). Observations of geese, swans, and loons by lake from Teshekpuk Lake are molting goose survey 2014.

LAKE No.	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	TUSW	TUSWC	YBLO	Total
157					65		2							67
158							5				10			15
159					175	15			1	4				195
160					134	88					9			231
161	30		240		625	3								898
162	510	20	308		92	6			243	10				1189
163														0
164							2				1			3
165											2			2
166					147	195								342
167					623	482	2				4			1111
168														0
169					80	10								90
170	120		6		110									236
171					26									26
172	25		51		383	12			75		4			550
173	12		30		132						5			179
174					32	5	2							39
175	245				642	115		1	18	25				1046
176	25		15		474	5								519
177					87	3					2	3		95
178														0
179														0
180	25				20						2			47
181	315		50		47	34								446
182	376	20	10		247	68		1						722
183					32									32
184			60											60
185	127		70		74									271
186	335				90									425
187			55		259	2								316
188											2			2
189														0
190					125	340								465
191														0
192					84									84
193					65									65
194					275		2				2			279
195														0
196														0
197	70		152	40	22									284
198	55		4											59
199					192	295			150					637
200	1556		189	20	314	67			823		2			2971
201					119	56			1		2			178
202			30		252	202			20					504
203-205	Off and near-shore coastal/lagoon segments. Numbered on survey map, but not surveyed													-
206			122		445	212			136	7				922
207	70	80			59	73			55	25				362
208			40		317	59	6		45	20				487
209			8		90	15			6	12				131
Grand Total	**12114**	**337**	**11023**	**631**	**34199**	**15112**	**96**	**7**	**7643**	**238**	**232**	**31**	**1**	**81664**
	BLBR	**BLBRB**	**CAGO**	**CAGOB**	**GWFG**	**GWFGB**	**PALO**	**RTLO**	**SNGO**	**SNGOB**	**SWAN**	**SWANC**	**YBLO**	

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