TESHEKPUK LAKE AREA MOLTING GOOSE SURVEY – 2010

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Waterfowl Management
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Abstract: The 29th annual molting goose survey, conducted in the area north and east of Teshekpuk Lake on the Arctic Coastal Plain of Alaska, was conducted on 15-21 July 2010. Pacific brant, Canada geese, white-fronted geese, and snow geese were recorded throughout the survey area with counts of adults and (goslings) at 18,212 (101), 14,498 (7), 26,838 (4,923), and 5,468 (102), respectively. Totals of 245 tundra swans with 37 cygnets were also counted throughout the survey area. Geese were also counted outside of the traditional survey area from Cape Simpson to the Colville River delta focusing on suspected Pacific brant molting areas. A total of 11,915 Pacific brant were counted in these additional areas.

Key Words: aerial survey, molting geese, Teshekpuk Lake, National Petroleum Reserve **March 2011**

INTRODUCTION

This report summarizes the results from the 2010 Teshekpuk Lake area molting goose survey. The survey, initiated in 1976 and repeated in 1977-78 and conducted annually since 1982, monitors the abundance and distribution of molting geese that use the area north and east of Teshekpuk Lake. The significance of this area to molting geese was first documented by Henry (Hank) Hansen in 1957 (King 1970). Past surveys of the area have documented large concentrations of molting Pacific brant (*Branta bernicla nigricans*), Canada geese (*Branta canadensis*), and white-fronted geese (*Anser albifrons frontalis*).

This survey documents abundance and distribution of molting geese during the survey period (mid July). This timeframe is believed to be the peak of the molting period for most geese, and observations during the survey (flightless geese) substantiate this assumption. 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 1976-2010) has changed over time (Flint et al. 2007). Therefore, data collected during this survey should only be used 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.

Pacific brant molting areas outside of the traditional survey area were flown this year. These additional areas were identified during a study conducted by the USGS Alaska Science Center (Lewis et al. 2009).

STUDY AREA AND METHODS

Teshekpuk Lake Area

The survey area included approximately 197 lakes and several bay, shoreline, and creek segments located north and east of Teshekpuk Lake (Figure 1). Each lake was identified by a unique number and observations of geese, swans, and loons were recorded for each lake. The 2010 survey was flown in a Cessna 206 amphibious equipped aircraft (N234JB) at 45-60 meters (150-200 feet) above ground level and at airspeeds of 130-190 kilometers per hour (80-110 knots). Aircraft navigation was maintained by an aerial photographic-based paper map with lake identifiers (numbers) printed on the map and by a remote computer screen running a moving map program developed by John Hodges (USFWS-retired). The aircraft flight path was recorded by a laptop computer connected to the aircraft global positioning system (GPS).

Shorelines of large lakes were flown so that feeding or loafing geese on land would be recorded. Surfaces of large lakes were also flown in a systematic fashion providing 100% coverage of the lake. Smaller lakes were flown so that the flight path over the lake provided an unrestricted view of the entire lake and shoreline. Observations from both observers were recorded directly into one laptop computer by the pilot/observer via a remote microphone (as sound files) using a program developed by John Hodges. A second computer program, 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

Six additional survey areas were flown this year, focusing on known and suspected brant molting areas. These additional areas (Figure 2) were identified during a study conducted by the USGS Alaska Science Center from preliminary aerial survey and Pacific brant GPS transmitter data. Individual lakes within these additional survey areas were not assigned unique numbers (as in the traditional survey area) due to the complexity and small size of some of the wetlands. Areas were surveyed using two different techniques. Complex wetlands were flown in a systematic manner using parallel flight lines, while larger bodies of water were flown using the same technique as the traditional survey (described above). Aircraft speeds, altitude, and navigation as well as data recording techniques were identical to the techniques used in the traditional survey area (described above).

RESULTS

Teshekpuk Lake Area

The 2010 survey was conducted over four days between 15-21 July. Totals of 65,016 adult geese and 5,133 goslings were recorded during the survey. Pacific brant accounted for 28% of the adult geese observed (18,212 adults and 101 goslings), while white-fronted geese accounted for 41% of the adult geese observed (26,838 adults and 4,923 goslings). Canada goose totals were 14,498 adults and 7 goslings and accounted for 22% of the adult geese observed. Snow geese (*Anser chen caerulescens*) accounted for 8% of the adult geese observed (5,468 adults and 102 goslings). Tundra swan (*Cygnus*

columbianus) totals were 245 adults and 37 cygnets. Pacific loon (*Gavia pacifica*), red-throated loon (*Gavia stellata*), and yellow-billed loon (*Gavia adamsii*) totals were 230, 79, and 17, respectively.

Observation totals for geese, swans, and loons are provided in Table 1 for the 2010 survey. Figures 3-5 and 7-8 illustrate the number of adult geese counted on this survey from 1982-2010. Figure 6 illustrates the number of white-fronted goose goslings counted on the survey from 1997-2010.

Additional Survey Areas

The additional survey areas were flown on 21 July 2010. Totals of 21,145 adult geese and 2,124 goslings were recorded during the survey. Pacific brant totals were 11,915 adults and 220 goslings. Greater than 88% of adult Pacific brant were recorded in the Cape Simpson area (5,402) and in the Piasuk River Delta located in the southwest corner of Smith Bay (5,131). White-fronted geese, Canada geese, and snow geese adults and (goslings) were; 4,430 (1,640), 1,135 (0), 3,665 (264), respectively.

Observation totals for geese and swans are provided in Table 2.

DISCUSSION

Teshekpuk Lake Area

<u>Pacific Brant</u>

The importance of this survey area to molting Pacific brant (Figure 3) is well documented in previous reports of this survey. The 2001 count for Pacific brant in this area (36,817) was the highest ever recorded and constituted approximately 30% of the total Pacific flyway population for that year. The 2010 count for brant in this area (18,212) accounted for approximately 11% of the total Pacific flyway population that was counted in the winter of 2009-2010 (~159,000, Mallek and Wortham, 2010), and was similar to the previous ten-year (2000-2009) mean of 19,893.

Data from this survey are useful to determine the number of brant that use this area in any given year during peak molt, as well as to determine the proportion of the Pacific flyway population that molt in this area in a specific year. While these numbers are useful indicators of the importance of this area to brant, they can not be used to estimate the proportion of the Pacific flyway population that uses this area in their life cycle. Some brant may use this area only once in their life time (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., as an adult non-breeder). Therefore, the number or proportion of the population of brant that use this area in a specific year or averaged over multiple years is probably a biased indicator (biased low) of the use of this area by the Pacific flyway population.

Canada Geese

Use of the survey area by molting Canada geese is highly variable (Figure 3) and appears to be weakly correlated to use by Pacific brant. The 2010 Canada geese count was 14,498 which is similar to the previous ten-year (2000-2009) mean of 13,921.

White-fronted Geese

The nesting grounds of white-fronted geese that use this area is believed to be the Arctic Coastal Plain of Alaska (ACP). Although the estimated population of white-fronted geese during the nesting season on the ACP has grown over the last two decades (Larned et al. 2010), the molting population in the Teshekpuk Lake survey area has had substantially more growth (Figure 4). The 2010 count for adult white-fronted geese was 26,838 birds, while the gosling count was 4,923. The high gosling count suggests good white-fronted goose production throughout the ACP in 2010, and suggests that use of this molting area by white-fronted geese is continuing a positive trajectory.

Snow Geese

Use of the survey area by snow geese is relatively low when compared to other species of geese, although in recent years snow goose numbers have increased significantly (Figure 6).

Additional Survey Areas

The additional survey areas accounted for a significant portion of the total Pacific brant counted during this survey. The combined total of Pacific brant counted (traditional area plus the additional areas) during the survey was 30,127. Approximately 35% of this total (10,533) was counted on a portion of Cape Simpson and the Piasuk River Delta. While it is apparent that these two areas are of significant value to the Pacific brant population, little is known of their history of use by Pacific brant. It is unknown whether brant move between these molting areas and the area north and east of Teshekpuk Lake. Furthermore, it is not known whether these areas have a pattern of increased, decreased, or stabilized use. Finally, it is not known if there has been a spatial shift in use within these areas, as has been document in the area north and east of Teshekpuk Lake (Flint et al. 2007). These unknowns suggest that additional annual surveys of these areas, specifically for molting brant, should be conducted.

CONCLUSION

The importance of the Teshekpuk Lake survey area to molting geese has been well documented and is a major reason this area gained temporary protection from oil development in 1998 and was reaffirmed in 2008 with a 10-year deferral to oil and gas leasing (U.S. BLM 2008). Since molting geese are highly susceptible to disturbance (Derksen et al. 1992), and in some years molting habitat provided by this small area is

extremely important to the global population of Pacific brant, continued protection of this area from disturbance caused by oil development is certainly warranted.

Data collected from the additional survey areas, specifically Cape Simpson and the Piasuk River Delta, indicate that these areas are of high value to molting Pacific brant. Additional protection of these areas from disturbance should be investigated.

ACKNOWLEDGMENTS

I thank Karen Bollinger (MBM-Fairbanks) for her help as an observer during the survey. I acknowledge Rod King (USFWS-retired) for collecting the majority of data (1982-1999) presented in the figures of this report. I also thank Paul Flint (USGS-Anchorage) for suggesting that we survey specific additional areas for brant based on previous work he and others had conducted. I thank Bob Platte (MBM-Anchorage) for his help with survey and report maps.

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Data and conclusions presented in this report are preliminary and are not for publication or citation in published manuscripts without the permission from the author.

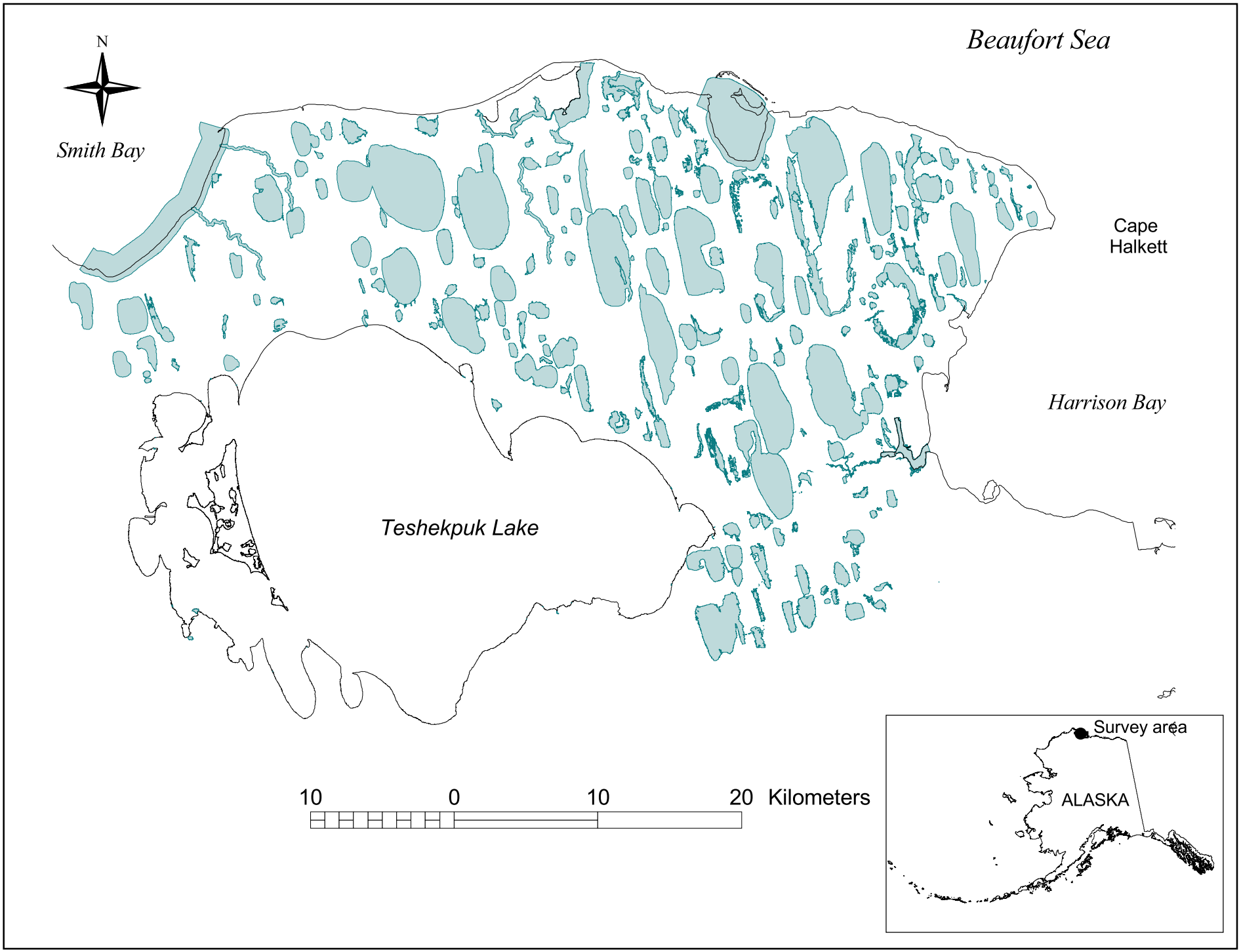


Fig. 1. Lakes, bay shorelines, and creeks surveyed by airplane for molting geese on a portion of the Arctic Coastal Plain of Alaska.

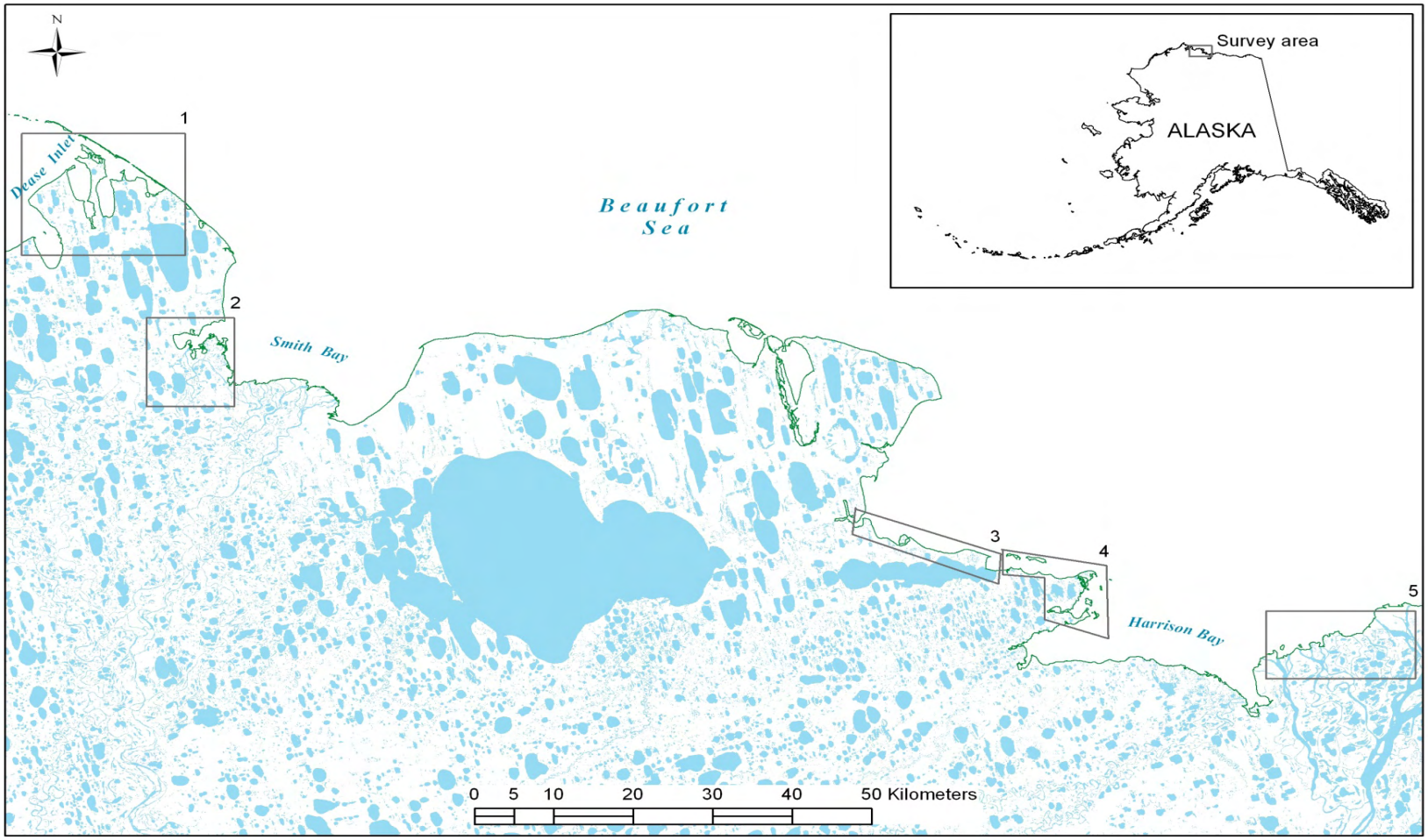


Figure 2. Additional survey areas searched for geese, 2010. 1 = Cape Simpson, 2 = Piasuk River Delta, 3= North Kogru Coast, 4 = Atigaru Point and Eskimo Islands, 5 = Colville River Delta.

Table 1. Observations of geese, swans, and loons by lake from Teshekpuk Lake area molting goose survey 2010.

Lake Number	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Grand Total
1			4		411	17					1			433
2	2				262	10					5		1	280
3					670	17	2							689
4					107	29	2				2		5	145
5											1			1
6											1			1
7							3							3
8					128	35	6				4			173
9					63	2								65
10							1							1
11							1							1
12	20	6			27	6								59
13							1				2			3
14					2	3	2							7
15			60		32				2					94
16					32						1			33
17					2						1			3
18			176	7	308	11			170					672
19			40		139	52			64					295
20	31	24			25	38								118
21	90		133		1175	17		9	330		5		9	1768
22					10	4	1				2			17
23			2		14	4	2				2			24
24			5		430									435
25					95	4								99
26					60		3							63
27	1				2		4	2			3	3		15
28			40		519	10	2				1			572
29			105		416	4	3	10			1		1	540
30					100									100
31			25		142	33		2						202
32					45	26	3				2			76
33														0
34					10	14	1							25
35							2	9			2			13
36	53	5	100		510	4	2	2	1		4			681
37					6	4	2				2			14
38					30	42		3			2			77
39					44	10								54
40	10	5	121		814	40	3		3	3				999
41					6	10	1							17
42					25	10								35
43	2		2		2	6	4				2			18
44			74		420	17			11					522
45					18	28	1				2	3		52
46	20		108		113	10		7	311					569
47					8				350					358
48	133		99		803	68	4	6	485					1598
49					30				80					110
50														0
51	23		8		196	30								257
52			360		4		1							365

BLBR = Pacific brant, BLBRB = Pacific brant gosling, CAGO = Canada goose, CAGOB = Canada goose gosling, GWFG = greater white-fronted goose, GWFGB = greater 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.

Table 1 (continued). Observations of geese, swans, and loons by lake from Teshekpuk Lake area molting goose survey 2010.

Lake Number	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Grand Total
53	2681		2000		456	400			11	3	6			5557
54			140		561	12			165		2			880
55	172	4	577		200	178			2		4			1137
56			10		152									162
57			157		142									299
58			2		110						2	2		116
59			90											90
60			204											204
61	175		50		607						2			834
62	738	4	271		1597	11			9		2			2632
63					429				35					464
64							16	2			1			19
65					40									40
66					472	4			1					477
67			5		44	4	2							55
68					306	8					1			315
69											1			1
70			27		304									331
71							2				2	3		7
72			104		58	57	1				1			221
73							1							1
74	8	10	35		87	73	1		69	4				287
75	2				74	15	7	1	1		3	2		105
76					2	2	6				4			14
77					159	40	17		2		4			222
78					377	606	9				22			1014
79							4				1	3		8
80					58	15	1				3			77
81											4	2		6
82								3			2			5
83					145	105		7			11	2		270
84					150		7	2			2			161
85					280	14	3							297
86					14		8				2			24
87	14	2	119		356	332	2	1	19	7	3			855
88							1							1
89	2	3			40	27	5		7	3	1			88
90					7	6	5				4			22
91					130		2	1						133
92							5							5
93					220		2							222
94					130		1				6	1		138
95	4		342		123	53			6	4				532
96					31	7	3		8		2			51
97			1		40						2	3		46
98					120									120
99	527	3	482		905				16	6	2			1941
100					405				40					445
101					74	15	1				2	2		94
102			60		45				2	1				108
103					116	3	4				2	2		127
104	540		158		567		1	1	30		1			1298

BLBR = Pacific brant, BLBRB = Pacific brant gosling, CAGO = Canada goose, CAGOB = Canada goose gosling, GWFG = greater white-fronted goose, GWFGB = greater 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.

Table 1 (continued). Observations of geese, swans, and loons by lake from Teshekpuk Lake area molting goose survey 2010.

Lake Number	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Grand Total
105	150		70		400				10					630
106	1039		376		87				33	1	3			1539
107	815		195		162				4		1			1177
108														0
109	4	3												7
110	11		1255		222	24			10		1			1523
111														0
112			93		85									178
113	100		396		47	101			20					664
114			130		244	3					2			379
115			211		32	70			1					314
116			578		228	402					3			1211
117	18		28								1			47
118	510		830						16	50				1406
119														0
120														0
121			80											80
122			25											25
123	40		20		10									70
124	648		60											708
125	33		100		113	21					4			271
126							1				1			2
127			70											70
128														0
129	50				230		3				5			288
130														0
131					12									12
132	108		132		92	30								362
133	495													495
134	96				6									102
135	10		10		12	24								56
136														0
137	100		50								2			152
138														0
139	25				20	35								80
140	20		182		60				7					269
141	220		284		15									519
142	95		129		120				2					346
143	30		47		54	8					1			140
144	20		50		125				2	2	1			200
145	466	1	337		464	57		1	248		3			1577
146							1				2			3
147			15		360									375
148											2			2
149	2776		239		615	25	1		841	4	5			4506
150	5	9	2		80	12	2		103		2	4		219
151														0
152			7		76	13								96
153														0
154					66	17	4							87
155					94	70	3							167
156					169	78	2							249

BLBR = Pacific brant, BLBRB = Pacific brant gosling, CAGO = Canada goose, CAGOB = Canada goose gosling, GWFG = greater white-fronted goose, GWFGB = greater 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.

Table 1 (continued). Observations of geese, swans, and loons by lake from Teshekpuk Lake area molting goose survey 2010.

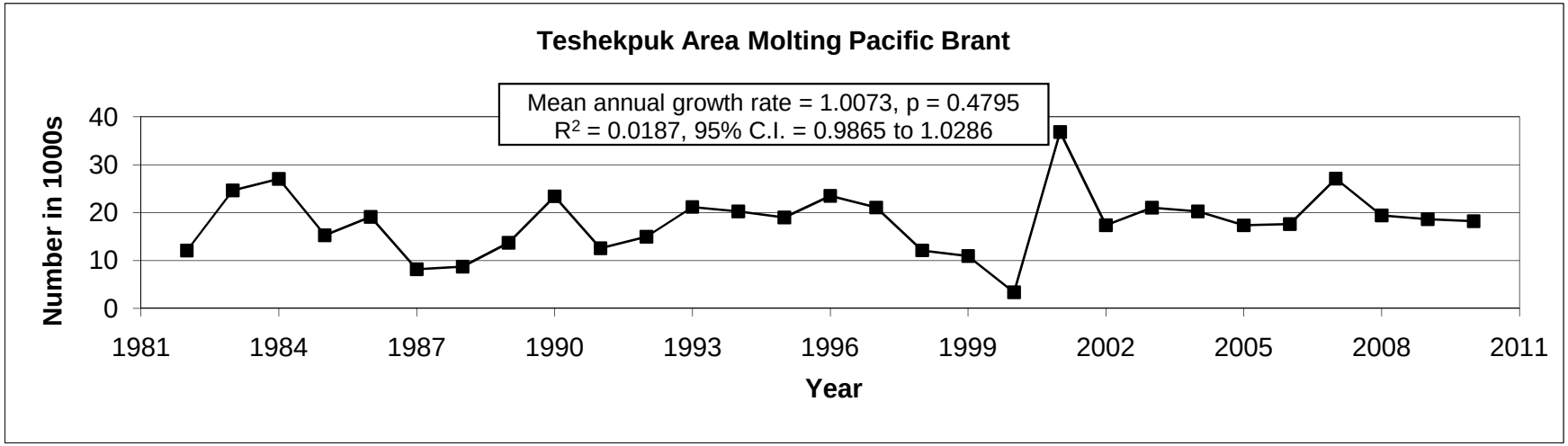
Lake Number	BLBR	BLBRB	CAGO	CAGOB	GWFG	GWFGB	PALO	RTLO	SNGO	SNGOB	SWAN	SWANC	YBLO	Grand Total
157														0
158														0
159							2				2			4
160					2		1				4			7
161	9		40		595	116	2	2			5			769
162	170		360		372	40			5		3			950
163			20		130						1			151
164							3							3
165					19	24	5				1			49
166					68	108	7				2			185
167			12		167	330	6				4	2		521
168							1							1
169					235									235
170	166		84		200				1					451
171	305		168		11	32			4	4				524
172	140		112		268	50	1		5					576
173	40		70											110
174	25		10		40									75
175	310		25		232	20								587
176	35		59		240									334
177					230	14	1				2			247
178														0
179	50													50
180					195	30					10			235
181	78		95		6	10					2	3		194
182	206		58											264
183														0
184	90				6									96
185			10											10
186	405		124		4	3								536
187	35		25											60
188														0
189														0
190											1			1
191	20													20
192					8	15					1			24
193	795						1							796
194							1				4			5
195	210				110									320
196			30		3	8	2							43
197														0
198	104		375		18	35								532
199	8				143	150	1	3	64	10			1	380
200	1825		286		194	11	2		1822		1			4141
201			1		38	33	3				2			77
206	34	10	217		239	87		1	30					618
207	8	12			89	51		1						161
208	12		20		232	138			10		6			418
209					56	26		3						85
Grand Total	**18212**	**101**	**14498**	**7**	**26838**	**4923**	**230**	**79**	**5468**	**102**	**245**	**37**	**17**	**70757**
	BLBR	**BLBRB**	**CAGO**	**CAGOB**	**GWFG**	**GWFGB**	**PALO**	**RTLO**	**SNGO**	**SNGOB**	**SWAN**	**SWANC**	**YBLO**	**Grand Total**

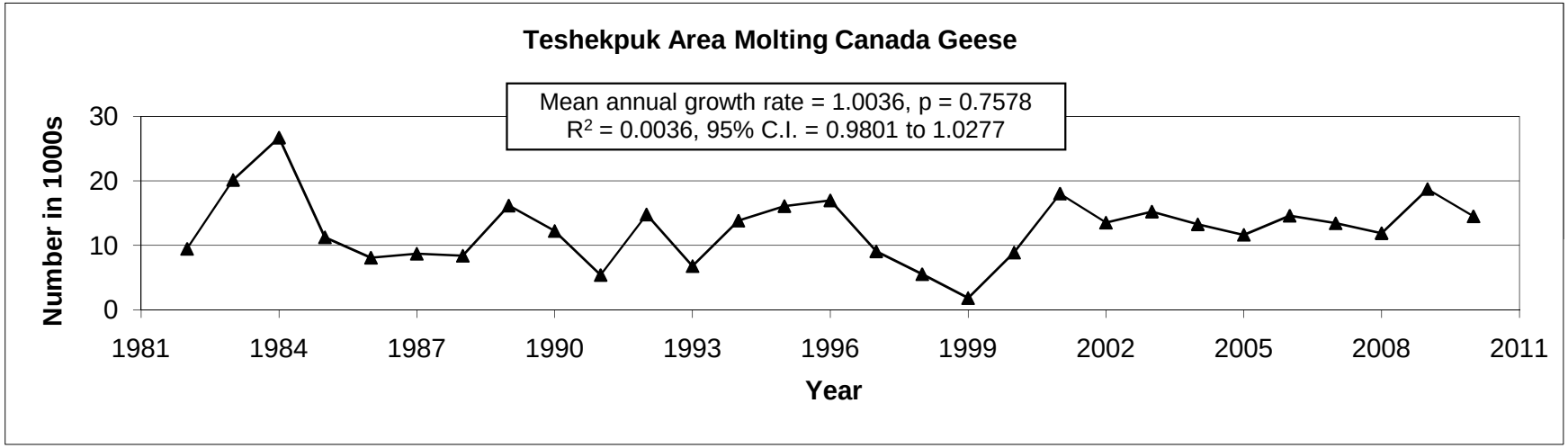
BLBR = Pacific brant, BLBRB = Pacific brant gosling, CAGO = Canada goose, CAGOB = Canada goose gosling, GWFG = greater white-fronted goose, GWFGB = greater white-fronted goose gosling, PALO = Pacific loon, RTLO = red-thoated loon, SNGO = snow goose, SNGOB = snow goose gosling, SWAN = tundra swan, SWANC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

Table 2. Observations of geese and swans by surveys area, Arctic Coast Alaska 2010.

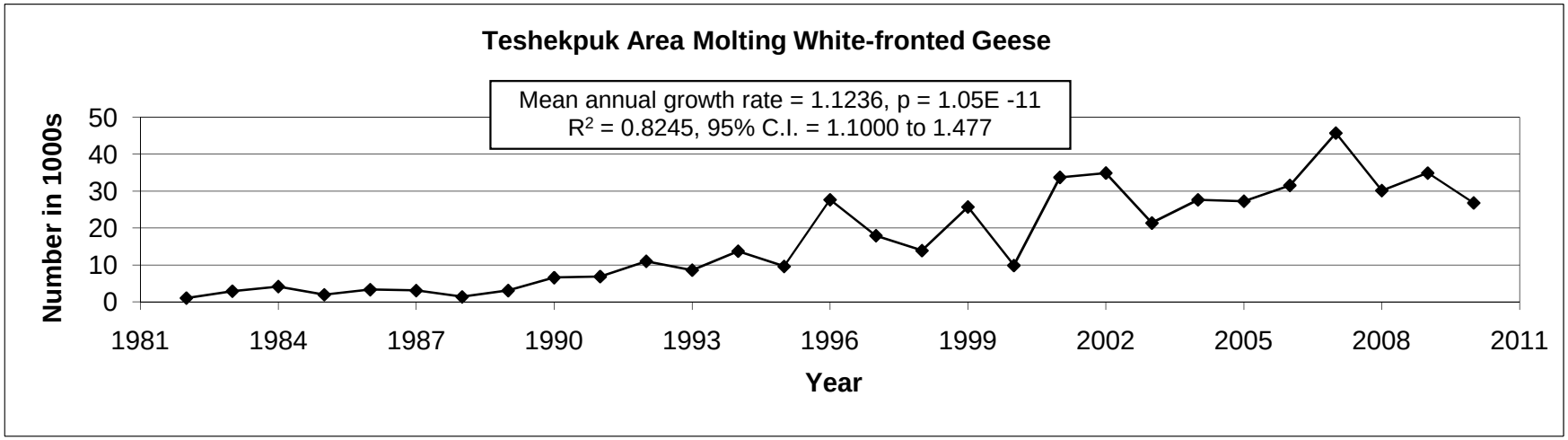
Survey Area	BLBR	BLBRB	CAGO	GWFG	GWFGB	SNGO	SNGOB	SWAN	SWANC	Grand Total
ATIGARU POINT	696		58	400	14	10		8		1186
CAPE SIMPSON	5402	128	1024	1552	716	294	8	15	2	9141
COLVILLE RIVER DELTA	439	82	6	2076	707	463	248	100		4121
ESKIMO ISLANDS			35	38						73
NORTH KOGRU SHORE	247			147	14	25				433
PIASUK RIVER DELTA	5131	10	12	217	189	2873	8	9	1	8450
Grand Total	**11915**	**220**	**1135**	**4430**	**1640**	**3665**	**264**	**132**	**3**	**23404**

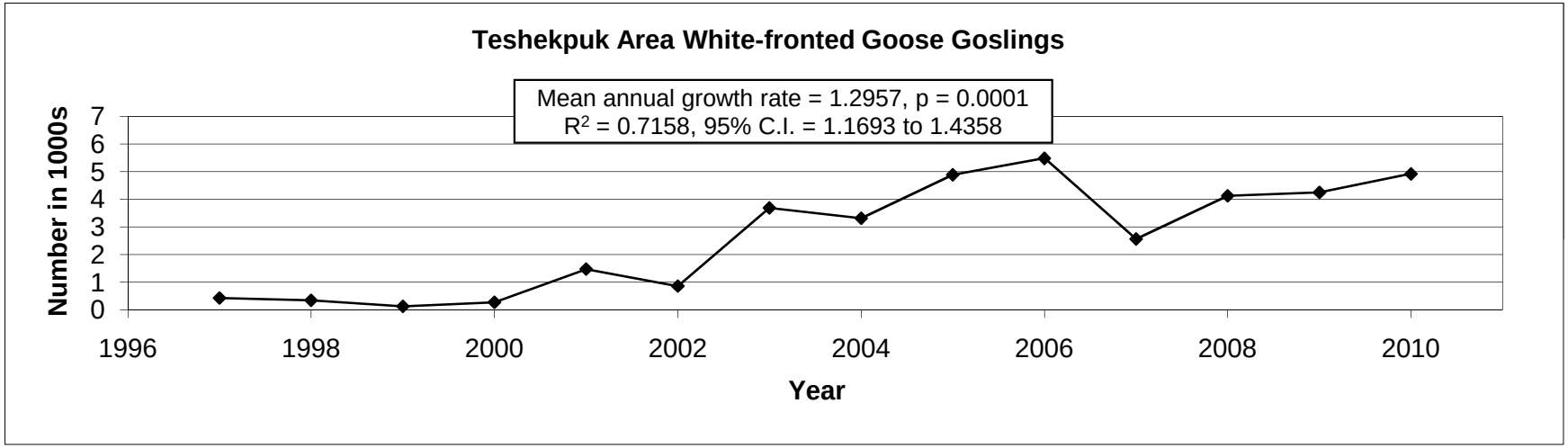
BLBR = Pacific brant, BLBRB = Pacific brant gosling, CAGO = Canada goose, CAGOB = Canada goose gosling, GWFG = greater white-fronted goose, GWFGB = greater white-fronted goose gosling, SNGO = snow goose, SNGOB = snow goose gosling, SWAN = tundra swan, SWANC = tundra swan cygnet.



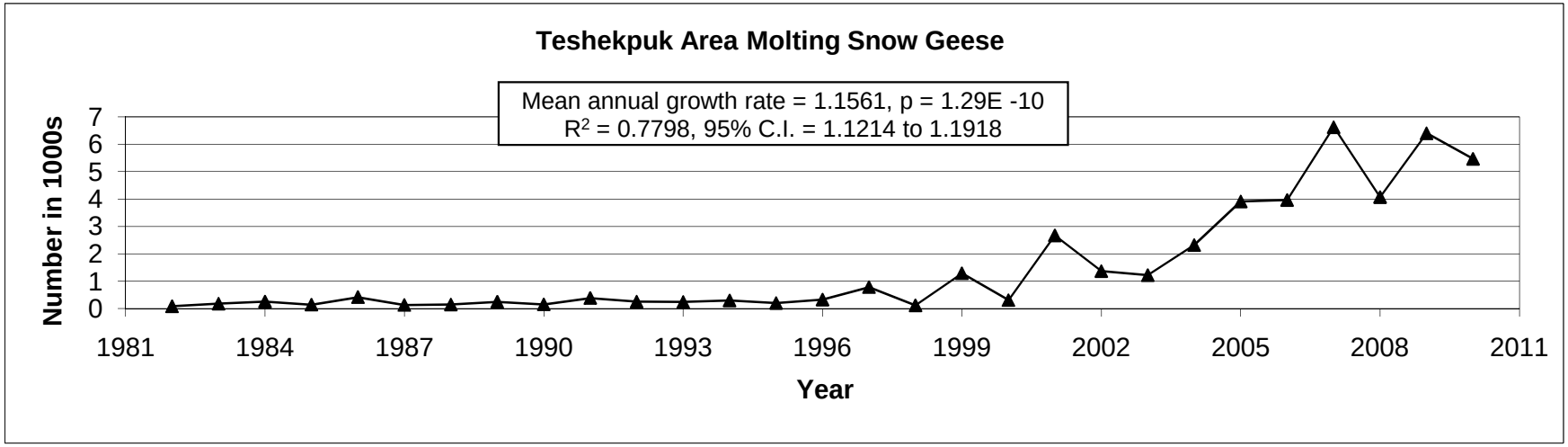


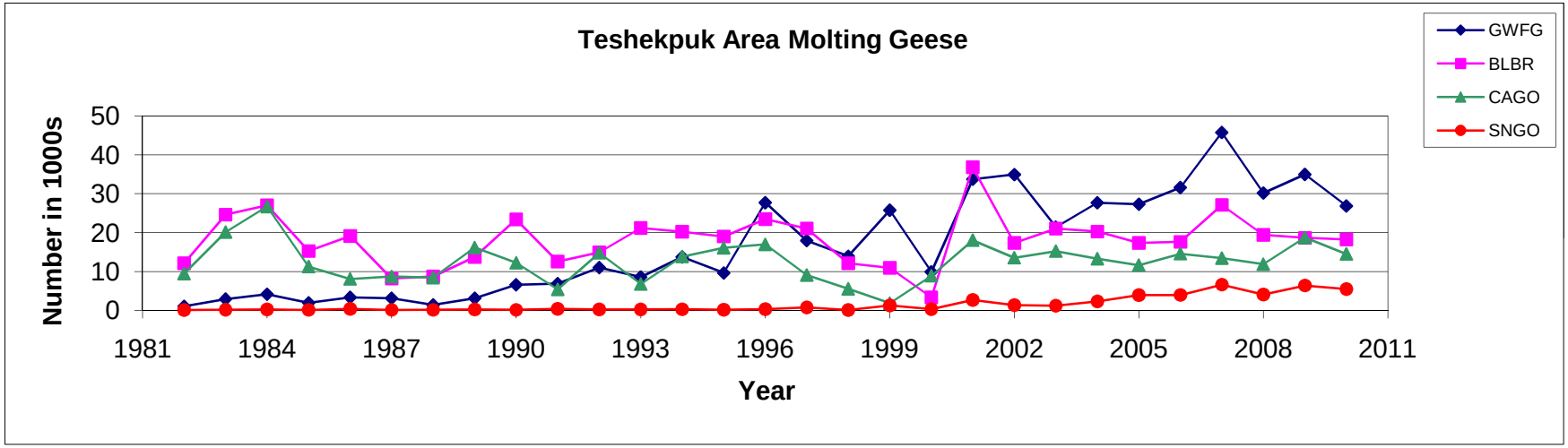
Figures 3 and 4. Numbers of adult and subadult Pacific brant and Canada geese molting on lakes and wetlands north and east of Teshekpuk Lake, 1982-2010 (goslings not included). Pacific brant: mean 1982-2010 = 18,097; mean 2001-2010 = 21,378; high count = 36,817 in 2001. Canada geese: mean 1982-2010 = 12,593; mean 2001-2010 = 14,481; high count = 26,681 in 1984.





Figures 5 and 6. Numbers of adult and subadult molting white-fronted geese 1982-2010 (goslings not included) and white-fronted goose goslings (1997-2010) on lakes and wetlands north and east of Teshekpuk Lake. Adult and subadult white-fronted geese: mean 1982-2010 = 16,797; mean 2001-2010 = 31,428; high count = 45,747 in 2007.





Figures 7 and 8. Numbers of adult and subadult snow geese and all geese molting on lakes and wetlands north and east of Teshekpuk Lake, 1982-2010 (goslings not included). Snow geese: mean 1982-2010 = 1,518; mean 2001-2010 = 3,803; high count = 6,626 in 2007.