

Aerial survey of wintering Pacific brant and other species at the Izembek NWR Complex and Sanak Islands, Alaska, January 2015.

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ABSTRACT: This report presents results of the 24-25 January 2015 aerial survey of Pacific brant and other species wintering at the Izembek Complex and Sanak Islands of Alaska. This survey serves as the Alaska component of the annual Mid-Winter Survey for Pacific brant, as outlined in the Pacific Flyway Management Plan. Our estimate of 50,316 brant is the highest count in the history of the survey (started in 1981). The estimate represents the sum of two components: 1) the average of replicate counts for Izembek Complex on 24 January (50,815) and 25 January (45,405), and 2) a single brant count of the Sanak Islands on 24 January (2,206). Counts of other species, including emperor geese and Steller's eiders are reported. The long-term growth rate of over-wintering brant in Alaska is 8.47% per year (1981-2015), and currently, Alaska comprises the largest geographic component of the Pacific Flyway Mid-Winter Survey population (~30%), outside of Mexico (~60%); with a growth rate of 12% per year over the past decade (2006-2015).

Key words: Winter survey, Pacific brant, Izembek Complex, Sanak Islands, Alaska.

March 2015

INTRODUCTION

Aerial surveys of wintering Pacific brant at the Izembek NWR including refuge coastlines and adjacent marine estuaries, (hereafter Izembek Complex), have been conducted annually since the winter of 1980-1981 (Fig. 1, Tables 4 and 5). In 2010, the survey was expanded to include the Sanak Islands (hereafter Sanak; Fig. 2, Tables 4 and 5). This survey serves as the Alaska component of the Pacific Flyway Midwinter Survey (hereafter PF-MWS) for brant, and documents winter distribution, abundance, population trend, and habitat use by brant and other species.

Eelgrass beds are the primary foraging areas for brant and occur from Moffet Bay to Bechevin Bay along the north side of the Alaska Peninsula, and in Kinzarof Lagoon and Morzhovoi Bay along the south side of the peninsula. Brant also use winter habitat at Sanak, 80 km south of Cold Bay. Although numbers there were not consistently documented prior to 2010 (Jones 1952, 1955, McKnight 1971 and Dau and Chase 1995), it appears brant regularly use this area; particularly during severe cold weather events. At Sanak, brant utilize eelgrass beds and other shallow intertidal habitats which often remain ice free.

METHODS

The 2015 winter survey of Izembek Complex and Sanak was flown from 24-25 January by Migratory Bird Management (MBM) personnel using an amphibious Cessna 206 aircraft (N9623R). Survey ground speed was approximately 160 km/hr (100 mph) and altitude was 45m (150 feet) above sea level (ASL). Georeferenced observations made from both sides of the aircraft were voice recorded into panel-mounted computers for later transcription using programs developed by Jack Hodges (USFWS-Migratory Bird Management, Juneau, AK).

Systematic flight paths provided coverage of all near shore and open water areas along shorelines and within estuaries (Fig. 3). Panel mounted computers provided moving map displays and paper topographic maps (scale 1:63,360) aiding navigation. We recorded survey conditions including ice cover, wind speed and direction, temperature, sky condition, visibility, and tide stage.

The Izembek Complex includes shorelines and estuaries from Moffet Bay to Bechevin Bay, along the north side of the Alaska Peninsula, and includes Kinzarof Lagoon and Morzhovoi Bay on the south side of the Alaska Peninsula (Figs. 1, 3). This collection of areas, including Izembek Lagoon, is collectively referred to as the “Izembek Complex”. The Sanak Island group includes Sanak, Caton, and surrounding islets (Figs. 2, 3).

All of Izembek and Kinzarof lagoons (Seg. 60-65, 84-85) were flown on 24 and 25 January, 2015. However, Bechevin and Morzhovi Bay areas (Seg. 67-68, 80-81) were flown only on 24 January. The Sanak Islands (Seg. Sanak North, Sanak South, Caton North, Caton South) were also only flown on 24 January.

SURVEY CONDITIONS

Winter conditions in southwestern Alaska had been relatively mild prior to our arrival in Cold Bay on 20 January (Mean temperature Jan 1-20 = 31°F), but became noticeably colder by the second day of surveying (25 Jan=25 °F). There was sparse lowland snow cover and fresh-water bodies had skim ice during the 2015 Izembek Complex surveys. Overall, ice cover was estimated at 10% in the northern estuaries (Bering Sea) and less than 5% in the southern estuaries (Pacific Ocean), and there was no marine or fresh-water ice cover at Sanak. There was less than two percent lowland snow cover throughout the survey area. During surveys, tide levels were high in Bering and mid-level in Pacific estuaries in the Izembek Complex on 24 and 25 January and mid-level in the Sanak and Caton islands on 24 January.

Visibility was good in the Izembek Complex on 24 January with scattered skies, occasional sun glare, and northeasterly winds of 10-15 mph. Visibility was excellent at Izembek on 25 January with high, overcast ceilings and variable winds of <5 mph. The exception was a period of light snow flurries and intermittent/patchy fog over 1/3 of central Izembek Lagoon on 25 January. Visibility was good at Sanak on 24 January with moderate sun glare and broken to scattered clouds > 2000 feet with northerly winds at 8-15 mph.

RESULTS

Pacific Brant

A combined total of 50,316 brant (Izembek Complex average [48,110] + Sanak [2,206]) was estimated, of which 86 percent were in the Izembek Complex. We calculated totals of 50,815 and 45,405 for the Izembek Complex on 24 and 25 January, respectively (Tables 1a-b). The entire Izembek Complex was not flown on 25 January. Thus, we corrected the 25 January Izembek Complex count of 41,076 (Izembek Lagoon segments only) by adding the 4,329 brant observed at Bechevin and Morzhovi bays on 24 January (Seg. 67-68, 80-81, Table 2), to reach a total of 45,405. We also observed 2,206 brant at Sanak on 24 January (Table 3), which we added to Izembek Complex average (48,110) to calculate the Alaska Mid-Winter total of 50,316. Marine ice was sparse and did not appear to restrict the distribution of wintering brant in either area. The long-term average of Alaska Mid-Winter counts (Izembek Complex: 1981-2015, and Izembek Complex + Sanak: 2010-2015) is $16,792 \pm 2,500$ (SE), and the survey shows an increasing, long-term trend of 8.47% per year (Fig. 4, Table 4).

Emperor Goose

Our combined total for emperor geese (Izembek Complex average + Sanak) was 5,856, with Izembek representing 57% of the combined total. We observed totals of 3,906 and 2,761 (corrected for Seg. 67-68, 80-81 on 24 January) emperor geese in the Izembek Complex on 24 and 25 January replicate surveys, respectively (Tables 1a-b, Table 2), resulting in an average of 3,334. In addition, we observed 2,522 emperor geese at the Sanak Islands on 24 January (Table 3). Izembek Complex winter counts (1980-2015) of emperor geese have been highly variable (range 542 - 5,139) primarily due to ice cover and habitat availability (average $2,885 \pm 225$ [SE], trend -0.8%/year, Migratory Bird Management).

Steller's Eider

Our combined total of Steller's eiders (Izembek Complex average + Sanak) was 29,506, with Izembek representing 82% of the total. We observed totals of 27,140 and 31,138 Steller's eiders (corrected for Seg. 67-68, 80-81 counted on 24 January) at Izembek Lagoon on 24 and 25 January, respectively (Tables 1a and 1b, Table 2). In addition, 367 Steller's eiders were observed at the Sanak Islands on 24 January (Table 3). The 2015 average Izembek count is nearly two-fold the average count from 1981-2014 and provides a current long-term average and trend of $18,667 \pm 1,854$ (SE) and -0.6%/year (MBM/Izembek NWR files). Sex composition of 64 Steller's eider flocks observed by the right-seat observer were as follows, 87.5% of flocks with an equal sex ratio, 1.6% predominately males, and 10.1% predominately females.

DISCUSSION / RECOMMENDATIONS

The Izembek count of wintering brant has been used as the Alaska component of the Pacific Flyway Midwinter Survey (PF-MWS) since the winter of 1985-1986. The survey was expanded in winter 2009-2010 to include the Sanak Islands (USFWS 2011, Pacific Flyway Data Book). We recommend that the current protocol, of combining the average of replicate counts from the Izembek Complex with a single count at Sanak, continue as the Alaska portion of the PF-MWS. Annual counts for both locations will also continue to be reported separately. Historical within-winter replicate counts conducted at Izembek have not been previously reported. We report these counts and information about each historical survey in Tables 4 and 5. We recommend that future within-winter replicate counts be conducted during the months of January and February, coincident with MWS counts conducted elsewhere. However, we included counts conducted between 28 November and 31 March in our recommended historical annual estimates for the Alaska Mid-Winter Brant Survey (see Table 4).

Sea ice averaged 5-10 percent within the survey area during the 2015 survey, resulting in a slightly clumped distribution of brant in the Izembek Complex, relative to no-ice years. Ice conditions determine habitat accessibility and restrict brant distribution (particularly in high ice years) to open-water areas (typically central Izembek Lagoon, Kinzarof Lagoon, and Hook Bay; C. Dau pers. obs.). Overall, winter weather conditions along the Alaska Peninsula had been mild in 2015 prior to the start of the survey; likely an important factor associated with increasing numbers of over-wintering brant, in general, at Izembek (Ward et al. 2009; Fig. 4). Whereas Alaska accounted for <5% of the winter brant population in the 1980's and 90's, over-wintering brant at Izembek currently comprise the largest geographic component of the 2005-2014 PF-MWS (~30%), outside of Mexico (~60%).

Brant counts at Sanak over the last 6 years (2010-2015), have averaged $4,556 \pm 1,188$ (SE) representing 5.1-28.5 percent of the overall Alaska winter count. We suspect larger proportions of wintering brant to be present at Sanak when ice conditions restrict habitat use at Izembek, but we require more variation in ice-years to investigate this hypothesis thoroughly. Anecdotally, we found an average of 77% of brant at Izembek when ice cover was >50% (Izembek/Sanak surveys 2009-10 and 2011-12), versus 94% when ice was reduced or absent (2010-11, 2012-13, 2013-14, and 2014-15). Additional studies will be required to better elucidate use of Sanak and Izembek by wintering brant under different ice regimes. However, if Sanak serves as an adequate refuge for brant temporarily displaced by ice at Izembek, Alaskan over-wintering birds may not face the potential 'ecological trap' (i.e., a trap created by periodic severe cold weather and extreme shorefast ice events at Izembek) once hypothesized (Ward et al. 2009).

The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

ACKNOWLEDGMENTS

We appreciate support of the staffs of the Alaska Peninsula/Becharof and Izembek NWR's for providing lodging, vehicle, and hangar use; and Grant Air (Cold Bay) for providing a temporary loan of fuel when local aviation gas was unavailable. We also thank Bob Platte for his continued assistance with map-making, safety planning, and aircrew preparation.



2015 Izembek Winter (IZW15) Crew: Chris Dau (right-front observer) and Heather Wilson (left-front observer/pilot) in C206 N9623R.

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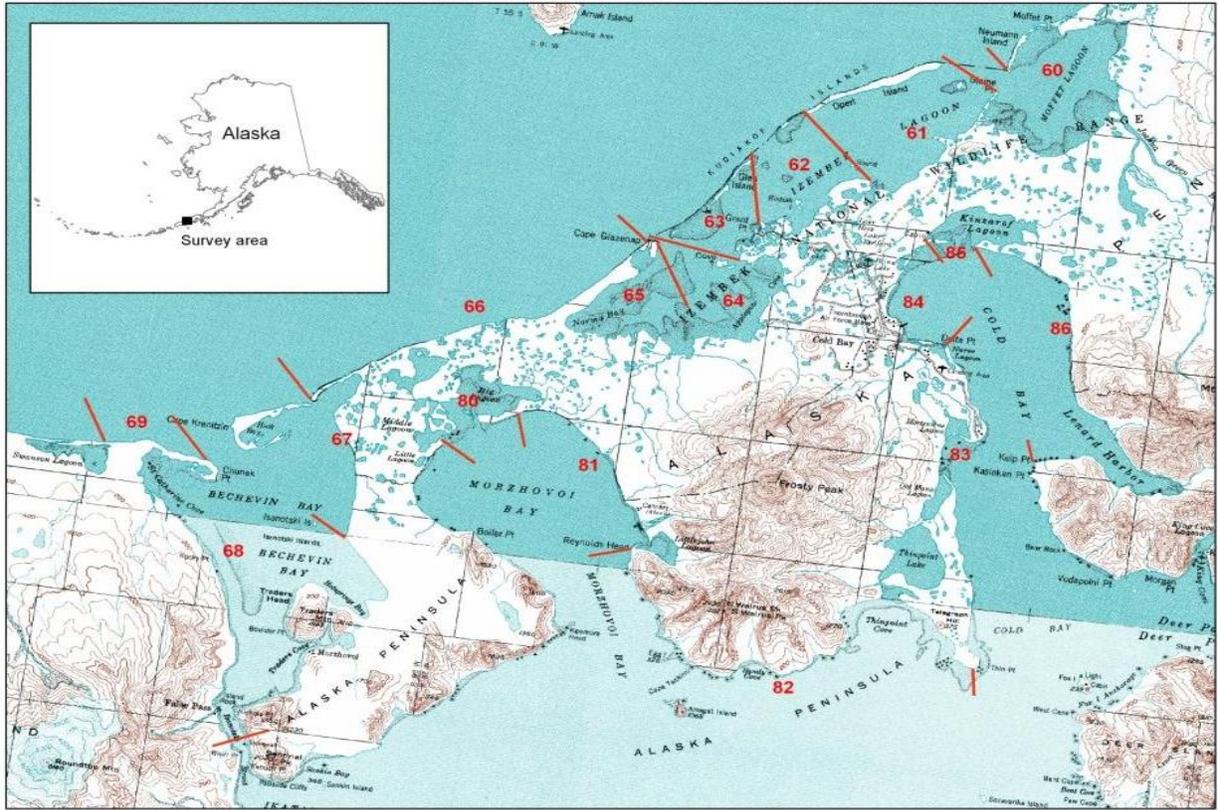


Figure 1. Pacific brant survey area by segment in the Izembek Complex.

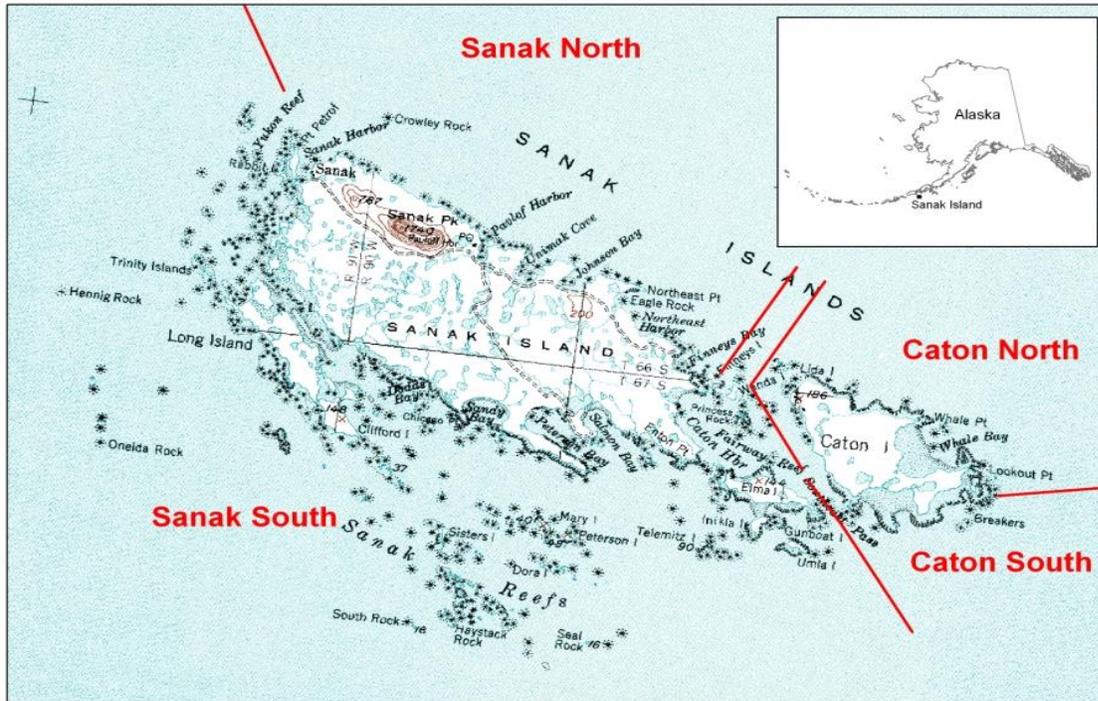


Figure 2. Pacific brant survey area by segment in the Sanak Islands.



Figure 3. Aircraft track for 24 January 2015, showing survey path for the Izembek Complex (Izembek Lagoon and Morzhovi and Bechevin Bays) and the Sanak Islands.

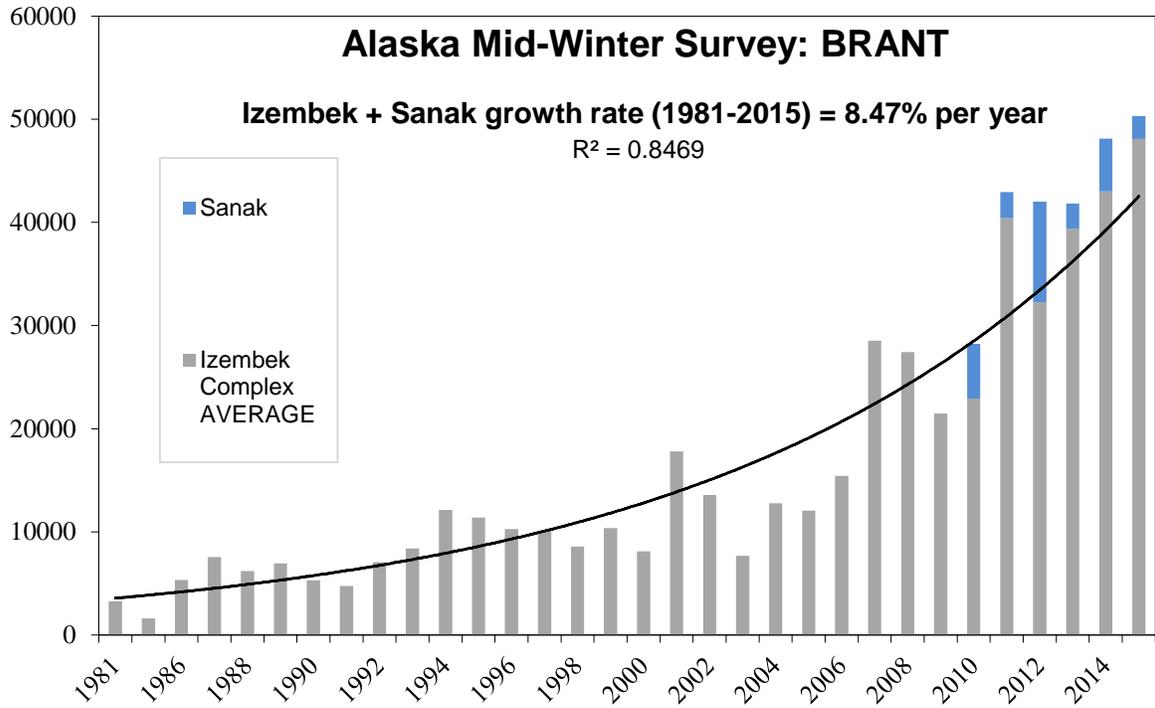


Figure 4. Trend in the Alaska component of the Pacific Flyway Midwinter index for brant (1981-2015). Annual totals represent averages of within-winter replicates at Izembek (grey bars), plus counts at the Sanak Islands, Alaska (blue bars).

Table 1a. Waterbird and mammal observations by segment, Izembek Lagoon, 24 January 2015.

SPECIES	SEGMENT NUMBER								TOTAL
	60	61	62	63	64	65	84	85	
Bald Eagle			2		1			1	4
Black Scoter	182	153	10		25	6	2	15	393
Black-legged Kittiwake	100								100
Brant	10	37,152	18	949	21	7,945		391	46,486
Common Murre								1	1
Common Raven					2	2			4
Emperor Goose	215	76		6	1,138			294	1,729
Glaucous Gull	20	84	4	32	62	94	3	15	314
Goldeneye				2	4			75	81
Greater Scaup	200				20	2,120			2,340
Harlequin Duck		10				3	10	80	103
Large gull ssp.	35	7	8	65	2		4	82	203
Long-tailed Duck	351	80	2	75		15		5	528
Mallard	1,670				500	473		425	3,068
Mew Gull					10				10
Northern Pintail	560					40			600
Pacific Loon		2						1	3
Pelagic Cormorant					10				10
R-b Merganser	27	5		14	3			632	681
Sea Otter	99	24	56	59	610	54		26	928
Sm. Shorebird ssp.							2,000	100	2,100
Steller's Eider	1,249	8,699	259	1,594	4,277	5,356		822	22,256
W-w. Scoter	21	15	4	2	1			2	45

Table 1b. Waterbird and mammal observations by segment, Izembek Lagoon, 25 January 2015.

SPECIES	SEGMENT NUMBER								TOTAL
	60	61	62	63	64	65	84	85	
Bald Eagle	1							3	4
Black Scoter	199	161	50		1		4	62	477
Brant		33,665	30	2,098	15	4,470		798	41,076
Common Raven				20	10		1	1	32
Emperor Goose	182	10		165	10	2	10	205	584
Glaucous Gull	13	13	1	1	35	12		15	90
Goldeneye					15			120	135
Greater Scaup						950			950
Harbor Seal								30	30
Harlequin Duck							30	26	56
Large gull ssp.	50	16	9		12	6	3	7	103
Long-tailed Duck	1,491	79	30	79		30	10		1,719
Mallard	1,465	250						248	1,963
Mew Gull	25	27			60			15	127
Northern Pintail	175					13			188
Pacific Loon	3								3
R-b Merganser	23	52			34	3		743	855
Sea Otter	62	27	141	27	510	25	3	4	799
Sm. Shorebird ssp.							20		20
Steller's Eider	3,255	11,814	595	2,601	814	6,475	20	680	26,254
W-w. Scoter	26	69	1			20			116

Table 2. Waterbird and mammal observations by segment, Bechevin and Morzhovi Bay Areas, 24 January 2015.

SPECIES	SEGEMENT NUMBER				TOTAL
	67	68	80	81	
Bald Eagle			2		2
Black Scoter	38	96	3	144	281
Brant	3,864	345	120		4,329
Bufflehead			20		20
Common Eider		30		685	715
Common Loon			1		1
Common Raven			1		1
Emperor Goose	1,199		702	276	2,177
Glaucous Gull	457	4	147		608
Goldeneye	5	1	720		726
Greater Scaup	225	800	90		1,115
Harlequin Duck			30		30
Large gull ssp.	189		13	2	204
Long-tailed Duck	51	2			53
Mallard	230	48	940	3	1,221
Mew Gull			200		200
Northern Pintail	12	25	165		202
Pelagic Cormorant	3	8			11
R-b Merganser	238	86	504		828
Sea Otter	619	17			636
Sm. Shorebird ssp.		30			30
Steller's Eider	4,339	170	375		4,884
W-w. Scoter	24	32	10	10	76

Table 3. Waterbird and mammal observations by segment, Sanak Islands, 24 January 2015.

SPECIES	SEGMENT				TOTAL
	Caton North	Caton South	Sanak North	Sanak South	
Am. G. W. Teal	250				250
Bald Eagle	3	12	11	23	49
Black Oystercatcher	30	110	112	71	323
Black Scoter		98	15	460	573
Brant	260	1,079		867	2,206
Bufflehead		20			20
Cattle			64	358	422
Common Raven	250	62	1	4	317
Emperor Goose	237	1,142	98	1,045	2,522
Glaucous Gull	5	241	20	21	287
Goldeneye	100		10		110
Greater Scaup			125	50	175
Harbor Seal				20	20
Harlequin Duck	17	378	5	357	757
Horse				50	50
Large gull ssp.		5	12	25	42
Long-tailed Duck			8	76	84
Mallard	191	230		105	526
Northern Pintail	746	266		100	1,112
Pacific Loon				1	1
Pelagic Cormorant	3	92	25	94	214
R-b Merganser		63	4	199	266
Sea Otter		1		3	4
Sm. Shorebird ssp.		200		500	700
Steller's Eider		83		284	367
Tundra Swan				33	33
W-w. Scoter		2	1	6	9

Table 4. Alaska mid-winter survey (AK MWS) 1981-2015. YEAR reflects the year in which January, February, and March surveys were flown.

Alaska Mid-Winter Waterfowl Survey

YEAR	Recommended Pacific Flyway Databook AK MWS ^{1,2}	Previous Pacific Flyway Data book AK MWS	Izembek Complex AVERAGE + SANAK	Sanak	Izembek Complex PEAK	Izembek Complex AVERAGE	Izembek Complex Within-Year Counts in Chronological Order ^{3,4}						
							≥ Nov. 27th	December	January	February	March		
1981	<i>3271</i>		3271		5540	3271		1602	2670				5540
1984	<i>1611</i>	1611	1611		1611	1611			1611				
1986	<i>5338</i>	7665	5338		7665	5338	7665		3010				
1987	<i>7550</i>	5755	7550		9355	7550	9355				<u>5745</u>		
1988	<i>6180</i>	8385	6180		8385	6180		<u>3975</u>	<u>8385</u>				
1989	<i>6918</i>	7050	6918		9795	6918	9795	7050	<u>3910</u>				
1990	<i>5303</i>	5595	5303		5685	5303	5685		5595				4630
1991	<i>4742</i>	4350	4742	*	4950	4742		4950	4350		<u>4925</u>		
1992	<i>7043</i>	7200	7043		8386	7043		6790	5797		<u>7200</u>		<u>8386</u>
1993	<i>8369</i>	8008	8369		10551	8369			7407 8008	10551			8862 7015
1994	<i>12125</i>	13221	12125		21249	12125	21249		7580 13221	<u>8942</u>			<u>12389</u> <u>9366</u>
1995	<i>11381</i>	11978	11381		12461	11381	9703		11978	12461			
1996	<i>10278</i>	9795	10278		17218	10278		17218	<u>9795</u>	7534	<u>9735</u>		8730 8658
1997	<i>10049</i>	13147	10049		13237	10049		7460 9451	13237				
1998	<i>8562</i>	8773	8562		8773	8562			8350 8773				
1999	<i>10354</i>	8255	10354		12348	10354		12348	8255		<u>10460</u>		
2000	<i>8120</i>	8833	8120		11917	8120		<u>11917</u>	<u>3610</u>		8833		
2001	<i>17790</i>	17790	17790		17790	17790					17790		
2002	<i>13576</i>	13576	13576		13576	13576					<u>13576</u>		
2003	<i>7677</i>	9168	7677		9168	7677		9168					6185
2004	<i>12756</i>	12756	12756		12756	12756							12756
2005	<i>12041</i>	17240	12041		19303	12041			19303 2638 4563	17238 16463			
2006	<i>15404</i>	19616	15404		21394	15404			10700		<u>11685</u> <u>21394</u> 17838		
2007	<i>28533</i>	40041	28533		40041	28533				15018 40041 32814 26257			
2008	<i>27422</i>	28329	27422		28329	27422			28329 26515				
2009	<i>21482</i>	21482	21482		21482	21482					<u>21482</u>		
2010	<i>28234</i>	26443	28234	5303	26443	22931			22567 22550	26443 20165			
2011	<i>42937</i>	45477	42937	2517	46383	40420				46383 29145			45733
2012	<i>42023</i>	44252	42023	9767	32256	32256			<u>32256</u>				
2013	<i>41821</i>	41821	41821	2413	39408	39408							39408
2014	<i>48140</i>	48140	48140	5129	50257	43011			50257 35765				
2015	<i>50316</i>	50316	50316	2206	50815	48110			50815 45405				
AVERAGE	16792	18260	16792	4556	18704	15938							
Growth rate	8.47%	8.47%			7.38%	8.10%							

¹ Proposed change relative to Pacific Flyway Databook (2014): in italics

² Recommended totals for 2009-present include Sanak Islands counts

* An exploratory survey of Sanak was flown on 15 February 1991 (Dau and Chase 1995); 1,189 brant were observed, extrapolated to an estimated 3,052. The Sanak 1991 estimate is not included in the table, due to the substantial departure from later survey methods.

³ Partial surveys "corrected" for missed segments (i.e., segments flown on other days, in the same year, usually Bechevin/Morzhoivi areas, substituted) are shown as shaded cells in table. Additions to Izembek Lagoon totals were: 2006-07: (729 and 1,314), 2007-08: (7,815), 2014-15: (4,329)

⁴ Surveys conducted under high ice conditions (e.g., 80%+ of lagoon iced over) are underlined.

Table 5. Annual dates of all surveys, crews, and aircraft for the Alaska Mid-Winter Brant Survey 1981-2015.

*Asterisks denote surveys in which the Sanak Islands were flown.

YEAR	REPS	DATES	PILOT OBSERVER	OTHER OBSERVER(S)	AIRCRAFT
1980-81	3	12/30, 1/26, 3/9	J.E. Sarvis	K.A. Metzner	PA-18
1983-84	1	1/16	J.E. Sarvis	M.L. Nunn	PA-18
1985-86	2	11/29, 1/24	J.E. Sarvis	M.D. Blenden	PA-18
1986-87	2	11/27, 2/27	J.E. Sarvis	C.P. Dau	PA-18
1987-88	2	12/11, 1/15	J.E. Sarvis	C.P. Dau	PA-18
1988-89	3	11/29, 12/27, 1/17	C.P. Dau	D. Strom/R.L. West	PA-18
1989-90	3	11/29, 1/10, 3/29	C.P. Dau	M.A. Chase/S.S. Simpson/R.L. West	PA-18
1990-91	3	11/30, 1/9, 2/21 *2/15 (Sanak only)	C.P. Dau *Charter Pilot (Sanak)	J. Chase/M.A. Chase *C.P. Dau/M.A. Chase (Sanak)	PA-18, *PA-31 (Sanak)
1991-92	4	12/17, 1/23, 2/10, 3/26	C.P. Dau	C.F. Zeillemaker/M.A. Chase	PA-18
1992-93	5	1/14, 1/16, 2/26, 3/8, 3/24	C.P. Dau	N. Schlicten/C.F. Zeillemaker	PA-18
1993-94	6	11/30, 1/19, 1/26, 2/15, 3/9, 3/28	C.P. Dau	M.A. Chase/R.P. Schulmeister/D.H. Ward/C.F. Zeillemaker	PA-18
1994-95	3	11/30, 1/2, 2/14	C.P. Dau	S.D. Schulmeister/R.P. Schulmeister	PA-18
1995-96	6	12/1, 1/12, 2/16, 2/26, 3/4, 3/18	C.P. Dau	G.E. Siekaniec/R.P. Schulmeister/ S.D. Schulmeister/D.H. Ward	PA-18
1996-97	3	12/19, 12/23, 1/17	C.P. Dau	G.E. Siekaniec/J.E. Sarvis/R.P. Schulmeister	PA-18
1997-98	2	1/2, 1/8	M. Roy	-	PA-18
1998-99	3	12/15, 1/2, 2/10	M. Roy/C.P. Dau	R. Portwood/T.A. Schafer	PA-18
1999-00	3	12/17, 1/16, 2/22	M. Roy	L. Ziemba	PA-18
2000-01	1	2/26	C.P. Dau	D.H. Ward	PA-18
2001-02	1	1/30	C.P. Dau	D.H. Ward	PA-18
2002-03	2	12/21, 3/4	K.B. Fox	K.M. Sowl	PA-18
2003-04	1	3/5	W.W. Larned	K.M. Sowl	PA-18
2004-05	5	1/19, 1/26, 1/27, 2/26, 2/28	J.K. Richardson E.J. Mallek	K.M. Sowl P.D. Anderson/T.F. Donnelly	PA-18
2005-06	4	1/26, 2/15, 2/17 (x2)	J.K. Richardson E.J. Mallek	K.M. Sowl C.P. Dau	PA-18
2006-07	4	2/9, 2/13, 2/14 (x2)	J.K. Richardson	K.M. Sowl	PA-18
2007-08	2	1/25, 1/26	J.K. Richardson	C.P. Dau	PA-18
2008-09	1	2/2	E.J. Mallek	C.P. Dau	PA-18
2009-10	4	1,29, 1/30, 2/1, 2/2	F. Mueller K.S. Bollinger	C.P. Dau	PA-18 C206 Amphib
2010-11	3	*2/27, 2/28, 3/1	K.S. Bollinger	P.D. Anderson	C206 Amphib
2011-12	2	*1/14	E.J. Mallek	C.P. Dau	Kodiak Amphib
2012-13	1	3/28, *3/29 (Sanak only)	E.J. Mallek	C.P. Dau	Kodiak Amphib
2013-14	2	1/27, *1/28	H.M. Wilson	C.P. Dau	C206 Amphib
2014-15	2	*1/24, 1/25	H.M. Wilson	C.P. Dau	C206 Amphib