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Trumpeter Swan Survey of the Rocky Mountain Population Winter 2013

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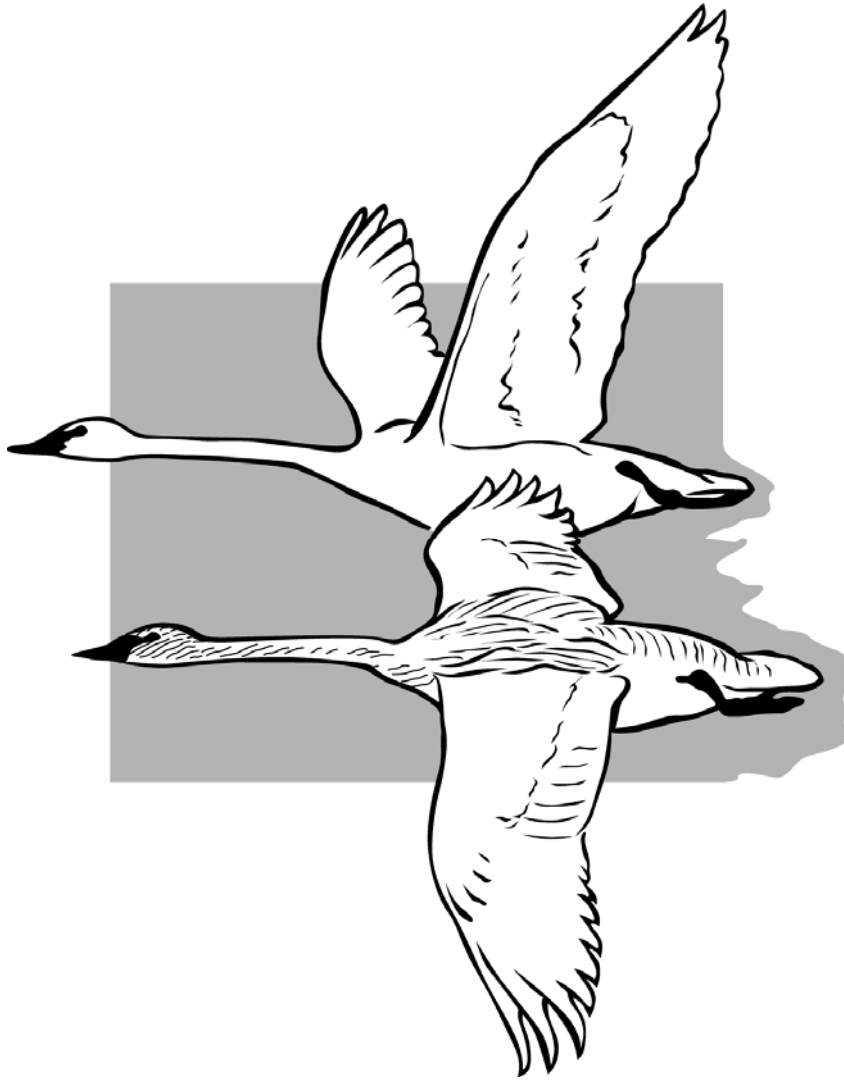
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U.S. Fish and Wildlife Service

Trumpeter Swan Survey of the Rocky Mountain Population

Winter 2013



Acknowledgements

Personnel who conducted the survey are listed in Appendix C. The survey is a collaborative effort among Red Rock Lakes NWR, Migratory Birds and State Programs -- Mountain-Prairie Region of the U.S. Fish and Wildlife Service, Southeast Idaho National Wildlife Refuge Complex, National Elk Refuge, Harriman State Park, Idaho Department of Fish and Game, Grand Teton National Park, Yellowstone National Park, Wyoming Game and Fish Department, Ruby Lake NWR, Malheur NWR, and the Shoshone-Bannock Tribes. Additionally, R. Cavallaro, M. Wackenhut, D. Christopherson, K. Cameron, and R. Lonsinger, assisted with counts in Idaho. S. Patla, N. Cadwell, D. Smith, M. St. Louis, and K. Cutting provided information and narratives used to develop this document; conclusions are attributable only to the author.

**TRUMPETER SWAN SURVEY
of the
ROCKY MOUNTAIN POPULATION**

WINTER 2013

U.S. Fish and Wildlife Service
Migratory Birds and State Programs
Mountain-Prairie Region
Lakewood, Colorado

April 2, 2013

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Abstract.— Observers counted 6,425 swans (white birds and cygnets) in the Rocky Mountain Population of trumpeter swans during early February 2013, which was similar to the 6,431 counted during winter 2012. In the tri-state area, the number of total swans increased for Montana (80%) and Wyoming (4%) from counts in 2012. Idaho decreased by 5% from last year but ID observed 520 swans in 2012 that were not classified as adults or cygnet so the decrease may not reflect what is actually occurring. The number of birds wintering in areas near restoration flocks, decreased by 16% from 2012. The numbers of birds at Ruby Lake National Wildlife Refuge (NWR) (37), Malheur NWR (3) and Summer Lake Wildlife Management Area (WMA) (85) decreased -9%, -81% and -9%, respectively, from 2012. Reservoir levels in early February were lower than during winter 2012 and 9% below the long term average. Temperatures in the tri-state area and in Yellowstone National Park during winter 2012-13 were at long term average.

The Rocky Mountain Population (RMP) of trumpeter swans (*Cygnus buccinator*) consists of birds that nest primarily from western Canada southward to Nevada and Wyoming (Fig. 1). The population is comprised of several flocks that nest in different portions of the overall range. The RMP/Canadian Flocks consist of birds that summer primarily in southeastern Yukon Territory, southwestern Northwest Territories, northeastern British Columbia, Alberta, and western Saskatchewan. The RMP/Tri-state Area Flocks summer in areas at the juncture of the boundaries of Montana, Wyoming, and Idaho (hereafter termed the tri-state area) and nearby areas (Fig. 2). The Canadian and Tri-state Area flocks winter sympatrically primarily in the tri-state area. In addition, efforts have been made to establish several RMP restoration flocks, such as those at Ruby Lake National Wildlife Refuge (NWR) in Nevada (i.e., Nevada flock) and those at Malheur NWR and Summer Lake Wildlife Management Area (WMA) and vicinity (i.e., Oregon flock), by translocating adult swans and cygnets from other portions of the RMP. These birds tend to winter in areas near those where they nest. These terms for the various groups of swans are consistent with the Pacific Flyway Management Plan for the RMP of Trumpeter Swans (Subcommittee on the Rocky Mountain Population of Trumpeter Swans 2008).

Although counts of swans wintering in the tri-state area have been conducted since at least the 1950s (Banko 1960), many early efforts were not well-coordinated and were variable. In an attempt to better coordinate the survey, in 1972 the U.S. Fish and Wildlife Service (Service) began the annual Mid-winter Trumpeter Swan Survey in the tri-state region. During the next decade, the area surveyed increased substantially, and by 1981 it was believed all known occupied wintering sites were included (Gale et al. 1988). Recent attempts to expand the wintering range of RMP trumpeter swans have resulted in the inclusion of yet more areas to the survey. Also, some areas may not be surveyed in a particular year due to weather or resource limitations (e.g., staff, money). Such survey modifications make individual counts from year-to-year less comparable, but the data are sufficient to reasonably depict trends in abundance.

The Mid-winter Trumpeter Swan Survey is conducted annually in late January or early February. The survey is conducted cooperatively by several administrative entities and is intended to provide



Fig. 1. Approximate ranges of trumpeter swans during summer (from Moser 2006).

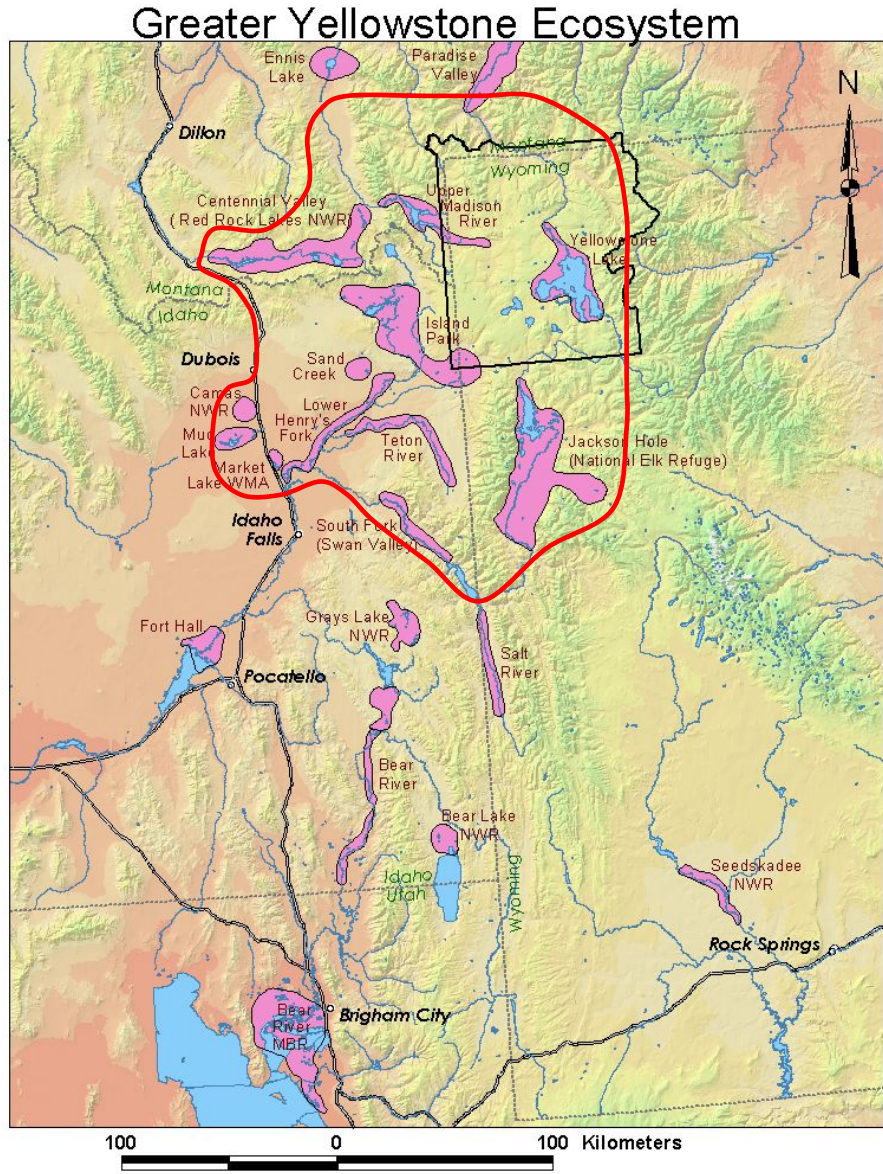


Fig 2. Map showing the 'core' Tri-state Area (inside of line) of southeast Idaho, southwest Montana, and northwest Wyoming (Dr. Rick Sodja and Lisa Landenburger, USGS, NRMSC, Bozeman, MT).

an annual assessment of the number of RMP trumpeter swans. Only data from 1972 to present, the time frame during which the Service has coordinated the survey, were analyzed for this report.

METHODS

The survey generally is conducted within a relatively short time frame (i.e., 1 week) to reduce the possibility of counting swans more than once due to movements of birds among areas. Aerial cruise surveys generally are used to count numbers of swans in the tri-state area, Nevada, Malheur NWR, and in the Summer Lake WMA and vicinity; ground surveys are used to count the number of swans in isolated pockets of habitat not covered by aerial surveys. During aerial surveys, data are collected by observers seated in a single-engine, fixed-winged aircraft. Flying altitude varies with changes in terrain and surface winds, but generally averages 30-60 m above ground level, and flight speed is between 135-155 kph. One to two observers and the pilot count white (i.e., adults and subadults) and gray (i.e., cygnets) swans in known or suspected habitats. Counts are not adjusted for birds present but not seen by aerial crews, and have an unknown and unmeasured sampling variance associated with them. Ground surveys are used to verify species composition of some swan flocks, because trumpeter and tundra (*C. columbianus*) swans are difficult to differentiate during aerial surveys. Efforts are made to identify and exclude tundra swans from the survey counts. Generally about 30 hours of flight time and additional time spent conducting surveys on the ground are required to complete the survey.

Annual estimates of abundance for Canadian Flocks are determined by subtracting the count of the RMP/U.S. Breeding Segment in the previous fall (e.g., U.S. Fish and Wildlife Service 2008a) from the Mid-winter count. For the estimate of the size of the Canadian Flocks to be accurate, several conditions must be met. First, all swans must be correctly identified to species. Second, the Mid-winter count and the fall count of swans in the RMP/U.S. Breeding Segment must be accurate. Additionally, we must assume that mortality in the RMP/U.S. Breeding Segment between the time of the fall and winter surveys is negligible. Because of problems inherent in surveying biological populations, these conditions probably are seldom met. Thus, this methodology for estimating the size of the RMP/Canadian Flocks likely leads to somewhat biased estimates of the composition of the RMP. This bias became evident during the 2010 North American Swan Survey (Groves 2012) in which the RMP/Canadian Flock was 3,722 more birds than what was stated in the 2011 Winter Swan Survey (U.S. Fish and Wildlife Service 2012).

To assess production for the RMP, we calculated the percentage of annual total swan counts that were cygnets. However, surveys in Nevada and Oregon did not separate counts into white birds and cygnets until 1992. Therefore, to allow an assessment over a longer time frame with data that are relatively comparable from year-to-year, we used only information from birds counted in the tri-state region. This subset contained a large majority (range = 87%-98%, mean = 95%) of the total RMP counts during 1972-2012. Counts used for analyses in this report are provided in Appendix A.

RESULTS AND DISCUSSION

The 2013 Mid-winter survey was conducted between 2 and 14 February. Aerial surveys in the tri-state area were completed by 14 February and required about 26 hours to complete. Across most of the areas weather conditions were variable with clear skies and calm winds to cloudy skies and fog with light winds. Ponds and reservoirs had less open water than last year due to an extended period of cold temperatures in early January. The winter of 2012-13 began with frigid conditions from December through January across the Intermountain West and as the winter continued, developed into mild conditions.

Precipitation during December to February was 50% – 85% of normal throughout much of the tri-state area (Joint Agricultural Weather Facility 2013). Water levels at 5 reservoirs (American Falls, Island Park, Jackson Lake, Palisades, and Minidoka Dam/Lake Walcott) cumulatively were at 56% of storage capacity on 1 February (data from U.S. Bureau of Reclamation 2013a), 25% below the level of last year and 9% below the 1972-2012 average (Fig. 3). Together, these reservoirs comprise about 97% of the water-storage capacity for reservoirs listed in the Snake River Basin in eastern Idaho and extreme western Wyoming (U.S. Bureau of Reclamation 2013b). Snowpack as of 1 February throughout much of the tri-state area was generally 90% - 100% of normal, about 80% of normal in south-central Oregon, and about 70% of normal in northeastern Nevada (U.S. Department of Agriculture 2013).

The average streamflow on the Henrys Fork near Island Park Reservoir, Idaho during 15 January to 15 February 2013 was 482 cfs, which is the second highest flow since 2000 and 24% above the 1972-2012 average for that recording station (U.S. Bureau of Reclamation 2013a) (Fig. 3). The December-February temperatures were near or just above average throughout the Greater Yellowstone Ecosystem (Fig. 4).

Historical Trends

Methods used to estimate trends in rates of change in RMP abundance were detailed in a previous report (U.S. Fish and Wildlife Service 2003), and will not be reiterated here. Briefly, however, we used least-squares regression on log-transformed counts to assess rates of change in counts of swans over time. Counts from the current Mid-winter survey (2013) were compared to results from 1972-2012, a practice used in Service survey reports for other waterfowl (e.g., Zimpfer et al. 2012, U.S. Fish and Wildlife Service 2012b). Because Nevada and Oregon did not separate total counts of swans into white birds and cygnets prior to 1992 (see above), analyses to assess trends for white birds and cygnets used only counts from the tri-state area.

The counts for total swans of the RMP suggested an increase ($P < 0.01$) of 5.5% per year during 1972-2012 (Table 1, Fig. 5). The number of white birds and cygnets counted in the tri-state region both increased ($P < 0.01$) at 5.1% and 4.2 % per year respectively. Counts of birds in Montana

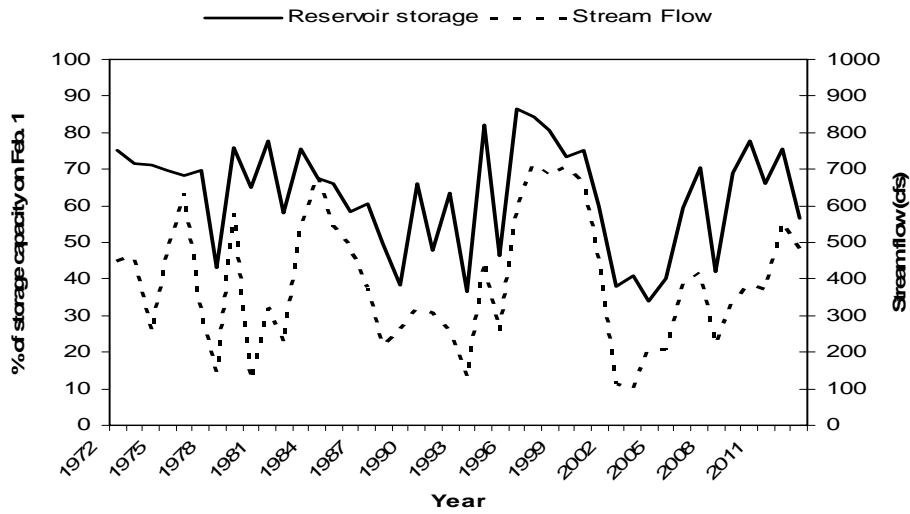


Fig. 3. Water storage for 5 reservoirs (see text) in the tri-state region on 1 February, and average streamflow between 15 January and 15 February on the Henrys Fork, 1972-2013.

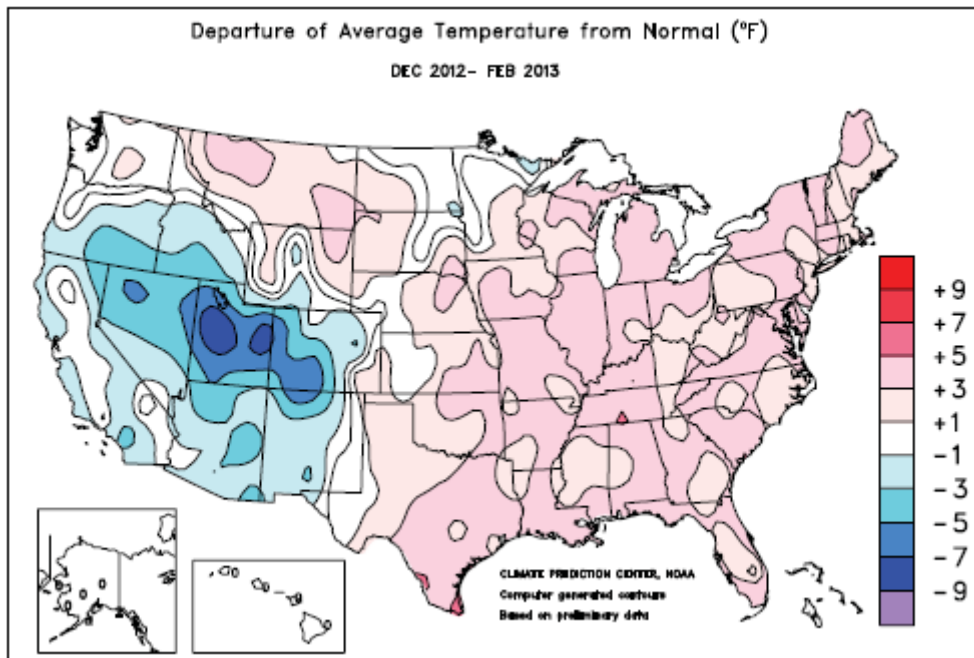


Fig. 4. Departure of average temperature from normal (°F) during December 2012 to February 2013 (Joint Agricultural Weather Facility 2013).

Table 1. Counts of trumpeter swans of the Rocky Mountain Population during winter, 1972-2013.

Year	<u>Tri-state area</u>			<u>Oregon and Nevada^a</u>			<u>Total RMP</u>		
	White	Cygnets	Total	White	Cygnets	Total	White	Cygnets ^b	Total
1972	c	c	616			91			707
1973	c	c	581 ^d			60			641
1974	553	156	709			61			770
1975	595	128	723			40			763
1976	623	102	725			55			780
1977	839	178	1017			46			1063
1978	695	179	874			27			901
1979	743	123	866			62			928
1980	767	172	939			86			1025
1981	1000	247	1247			98			1345
1982	952	266	1218			105			1323
1983	1025	207	1232			90			1322
1984	1128	332	1460			98			1558
1985	1326	190	1516			82			1598
1986	1304	299	1603			59			1662
1987	1196	386	1582			77			1659
1988	1314	408	1722			51			1773
1989	1452	291	1743			54			1797
1990	1591	416	2007			38			2045
1991	1589	342	1931			49			1980
1992	1642	397	2039	99	58	157	1741	455	2196
1993	1659	419	2078	121	36	157	1780	455	2235
1994	1753	543	2296	127	101	228	1880	644	2524
1995	2012	668	2680	93	30	123	2105	698	2803
1996	2129	580	2709	163	64	227	2292	644	2936
1997	2179	407	2586	77	18	95	2256	425	2681
1998 ^e	1756	307	2063	64	29	93	1820	336	2156
1999	2698	772	3470	45 ^f	10 ^f	71	2743 ^f	782 ^f	3541
2000	2694	746	3440	50 ^f	15 ^f	84	2744 ^f	761 ^f	3524
2001	3198	719	3917	47 ^f	11 ^f	90	3245 ^f	730 ^f	4007
2002	3814	546	4360	48 ^f	7 ^f	67	3862 ^f	553 ^f	4427

Table 1. (cont.)

Year	Tri-State Area			Oregon and Nevada ^a			Total RMP		
	White	Cygnets	Total	White	Cygnets	Total	White	Cygnets	Total
2003 ^g	3365	532	3897	62	15	77	3427	547	3974
2004 ^g	3785	746	4531	46	7	53	3831	753	4584
2005	4147	1143	5290	59	12	71	4206	1155	5361
2006	4203	1209	5412	58	14	72	4261	1223	5484
2007 ^h	3604	893	4619	56	26	82	3660	919	4701
2008 ^h	3744	790	4545	74	18	92	3818	808	4637
2009	4287	873	5160	90	15	105	4377	888	5265
2010	3553	676	4229	47	14	61	3600	690	4290
2011	4285	1302	5587	99	26	125	4384	1328	5712
2012 ⁱ	4657 ⁱ	1106 ⁱ	6283	126	22	148	4783 ⁱ	1128 ⁱ	6431
2013	5146	1154	6300	98	27	125	5244	1181	6425

^a Total counts not separated into white birds and cygnets prior to 1992.

^b Not calculated prior to 1992 because of no counts for Oregon and Nevada.

^c Not provided because counts for Yellowstone National Park not separated into white birds and cygnets.

^d In Wyoming only Yellowstone National Park surveyed.

^e 1998 counts for the Tri-state area and Total RMP are biased low because aerial survey of Yellowstone National Park not conducted due to hazardous weather; counted by snowmobile with incomplete coverage.

^f Counts biased low because white-bird and cygnet counts for Malheur NWR not available.

^g Oregon/Nevada and Total RMP counts biased low due to incomplete surveys at Summer Lake WMA.

^h White bird and cygnet counts for Tri-state area and Total RMP biased low because 122 birds in 2007 and 11 birds in 2008 in Idaho were not classified as white birds or cygnets.

ⁱ White bird and cygnet counts for the Tri-state area and Total RMP biased low because 520 birds near Rexburg, ID were not classified as white birds or cygnets in 2012.

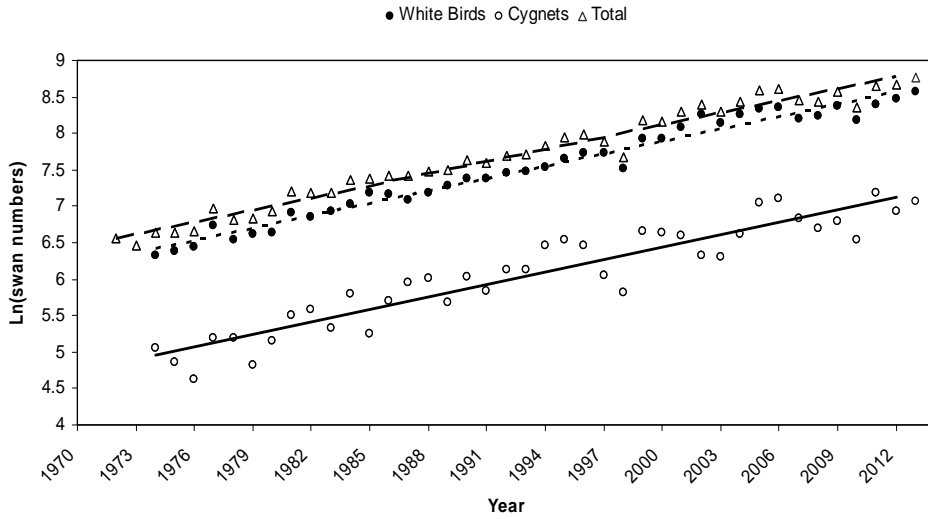


Fig. 5. Rates of change for counts of swans in the RMP during the Mid-winter Trumpeter Swan Survey, 1972-2013 (dotted and solid lines depict trends for white birds and cygnets, respectively, for swans counted in the tri-state region [see text]; dashed line depicts total RMP swans).

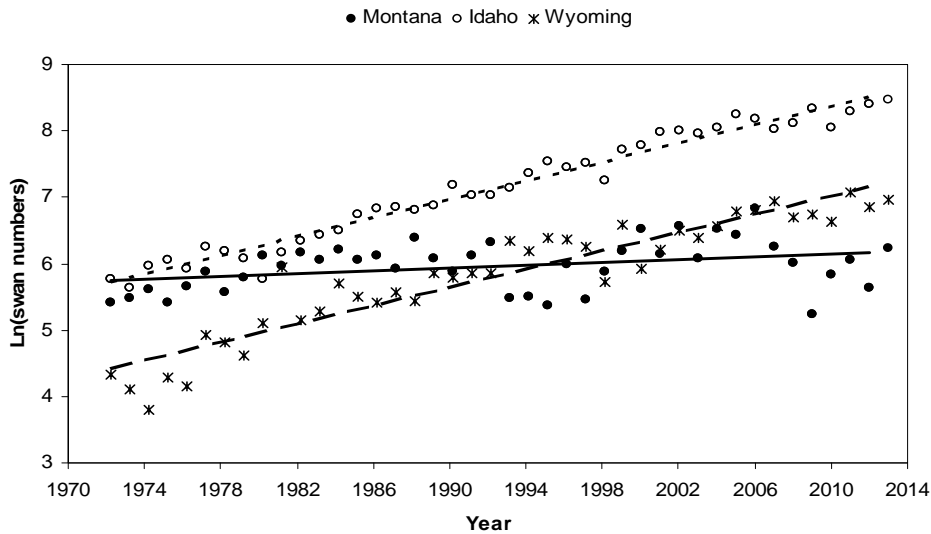


Fig. 6. Rates of change for counts of total swans in states of the tri-state region during the Mid-winter Trumpeter Swan Survey, 1972-2013 (solid, dotted, and dashed lines represent trends for Montana, Idaho, and Wyoming, respectively).

Table 2. Counts of trumpeter swans of the Rocky Mountain Population in individual states during winter, 1972-2013.

Year	Montana			Idaho			Wyoming			Oregon ^a			Nevada ^a		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1972	209	14	223	303	14	317	b	b	76			50			41
1973	212	28	240	222	58	280	b	b	61 ^c			32			28
1974	233	40	273	282	109	391	38	7	45			36			25
1975	192	32	224	333	94	427	70	2	72			15			25
1976	253	34	287	308	67	375	62	1	63			30			25
1977	315	43	358	395	126	521	129	9	138			17			29
1978	194	68	262	392	96	488	109	15	124			7			20
1979	304	26	330	353	81	434	86	16	102			41			21
1980	374	80	454	250	70	320	143	22	165			65			21
1981	352	36	388	370	110	480	278	101	379			77			21
1982	390	90	480	429	137	566	133	39	172			65			40
1983	363	59	422	493	122	615	169	26	195			52			38
1984	389	109	498	503	162	665	236	61	297			63			35
1985	393	31	424	701	144	845	232	15	247			51			31
1986	380	73	453	744	183	927	180	43	223			33			26
1987	314	63	377	690	255	945	192	68	260			49			28
1988	438	153	591	694	209	903	182	46	228			24			27
1989	342	90	432	817	141	958	293	60	353			36			18
1990	319	38	357	1025	300	1325	247	78	325			23			15
1991	385	70	455	918	211	1129	286	61	347			31			18
1992	438	114	552	892	249	1141	312	34	346	67	56	123	32	2	34
1993	168	70	238	1020	246	1266	471	103	574	91	36	127	30	0	30
1994	199	48	247	1164	397	1561	390	98	488	114	94	208	13	7	20
1995	153	61	214	1391	475	1866	468	132	600	72	27	99	21	3	24
1996	319	82	401	1336	390	1726	474	108	582	140	49	189	23	15	38
1997	204	30	234	1555	272	1827	420	105	525	46	9	55	31	9	40
1998	290	68	358	1200	200	1400	266 ^d	39 ^d	305 ^d	31	7	38	33	22	55
1999	335	153	488	1754	500	2254	609	119	728	16 ^e	2 ^e	34	29	8	37

Table 2. (cont.)

Year	Montana			Idaho			Wyoming			Oregon ^a			Nevada ^a		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
2000	519	155	674	1881	513	2394	294	78	372	15 ^e	6 ^e	40	35	9	44
2001	373	96	469	2404	549	2953	421	74	495	16 ^e	7 ^e	55	31	4	35
2002	600	104	704	2636	357	2993	578	85	663	7 ^e	5 ^e	24	41	2	43
2003	375	58	433	2490	382	2872	500	92	592	28 ^f	8 ^f	36 ^f	34	7	41
2004	583	92	675	2591	563	3154	611	91	702	8 ^f	0 ^f	8 ^f	38	7	45
2005	508	119	627	2954	828	3782	685	196	881	27	10	37	32	2	34
2006	713	211	924	2714	873	3587	776	125	901	36	14	50	22	0	22
2007	466	49	515	2294 ^g	664 ^g	3080	844	180	1024	38	16	54	18	10	28
2008	382	25	407	2694 ^g	616 ^g	3321	668	149	817	49	16	65	25	2	27
2009	168	21	189	3393	740	4133	726	112	838	53	15	68	37	0	37
2010	274	64	338	2631	501	3132	648	111	759	21	14	35	26	0	26
2011	307	121	428	3068	918	3986	910	263	1173	66	22	88	33	4	37
2012	262	18	280	3537 ^h	936 ^h	4993	858	152	1010	90	19	109	36	3	39
2013	404	101	505	3860	883	4743	882	170	1052	70	18	88	28	9	37

^a Counts for Oregon and Nevada were not separated into white birds and cygnets until 1992.

^b Not provided because counts for Yellowstone National Park not separated into white birds and cygnets.

^c Counts for Yellowstone National Park only; remainder of Wyoming not surveyed.

^d Counts for Wyoming biased low because aerial survey of Yellowstone National Park not conducted due to hazardous weather; counted by snowmobile with incomplete coverage.

^e Counts biased low because white-bird and cygnet counts for Malheur NWR not available.

^f Counts biased low due to incomplete surveys at Summer Lake WMA.

^g Counts biased low because 122 birds in 2007 and 11 birds in 2008 not classified as either white birds or cygnets.

^h Counts biased low because 520 TRUS in 2012 near Rexburg, ID were not classified as either white birds or cygnets.

(white birds + cygnets) increased slightly (+1.0% per year, $P = 0.03$), whereas average annual rates of growth for the number of birds wintering in Idaho (7.0%) and Wyoming (7.0%) ($P < 0.01$) were higher (Table 2, Fig. 6). Although the numbers of birds wintering in each of the 3 states in the tri-state region generally have increased since 1972, the distribution of birds among the states has changed substantially. Whereas during the 1970s and early 1980s about 36% of wintering swans were counted in Montana, only about 10% of the birds wintering in the tri-state area have been counted there during the last decade (Fig. 7). In contrast, the percentage of birds in Idaho has increased from about 53% to about 73% during that same time period. The percentage of birds counted in Wyoming during winter also has increased, from about 11% to 17%.

Counts of total swans wintering in Nevada have fluctuated over time, but suggest an increase ($P = 0.02$) of about 1.0% per year during 1972-2012 (Table 2, Fig. 8). Counts in Nevada during the early 2000s generally were near historic highs. Trumpeter swans in Oregon primarily occur in 2 areas, Malheur NWR and the Summer Lake WMA and vicinity. Introductions of trumpeter swans to Malheur NWR began in the late 1930s; however, birds were not translocated to Summer Lake WMA until the winter of 1992. Analyzing trends for the Oregon Flock as a whole (Table 2) could lead to inappropriate inferences. Therefore, we analyzed data for Malheur NWR (1972-2012) separate from those for Summer Lake WMA. Results suggest a decline (-3.9% per year, $P < 0.001$) for birds wintering at Malheur NWR (Fig. 8, Appendix A). At Summer Lake WMA, most birds were translocated to the area during winter and generally remained in the area for only a few months after being translocated (M. St. Louis, Oregon Department of Fish and Wildlife, personal communication). Thus, in 1997, the winter following the termination of translocations to Summer Lake WMA, the number counted during the survey dropped sharply (Fig. 8). From 1997-2013, an average of about 40 birds has been observed during winter surveys (excluding years with incomplete surveys).

The percentage of the entire RMP estimated to be comprised of Canadian Flocks increased from about 19% during February of 1972 to 92% during February 2005, and then decreased during 2006 to 2008 (Table 3). During 2009 the percentage rose to 91% but in 2010 dropped to 89%. As of 2013 91% of the RMP is comprised of Canadian Flocks. The data fit a 2nd-order logarithm model ($P < 0.01$, adjusted $R^2 = 0.94$), suggesting that the percentage may plateau near 90% (Fig. 9). The average percentage of the RMP being comprised of the Canadian Flock during 2001 – 2003 has been 90%. The number of swans estimated to be from Canadian Flocks exhibited a fairly steady increase since the early 1980s, and was nearly 5,000 birds in 2006, but declined to about 4,100 birds in 2008 (Table 3, Fig. 9). During the 2013 winter survey there were 5,832 birds were from the Canadian flock. This is the third year in a row the estimate was above 5,000 birds since the survey began in 1972.

Results from the 2013 survey

During the 2013 winter survey, observers counted 6,425 trumpeter swans in the RMP, which was similar to the count of last winter (6,431) (Table 1). The total number of swans in Montana and

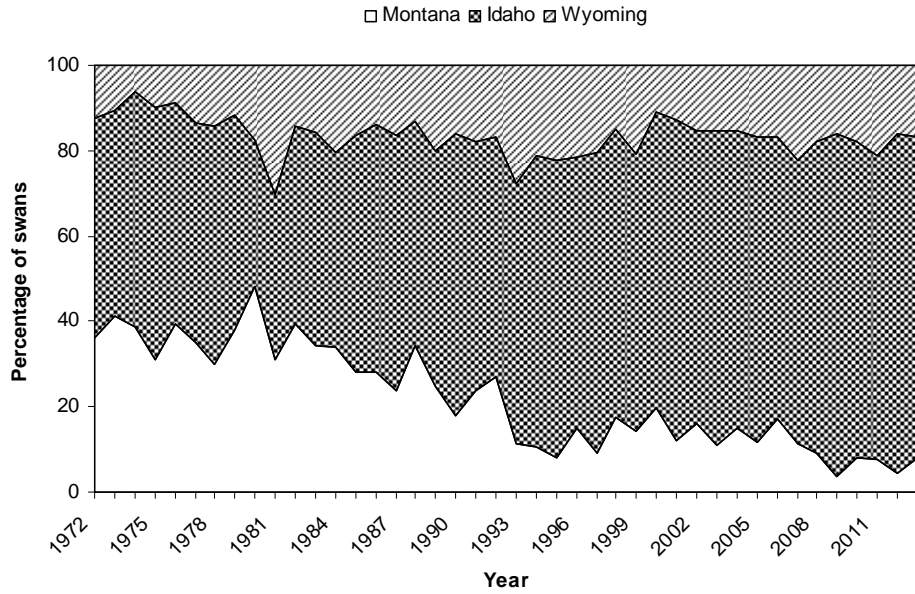


Fig. 7. Proportions of total swans counted in each of the states comprising the tri-state region during the Mid-winter Trumpeter Swan Survey, 1972-2013.

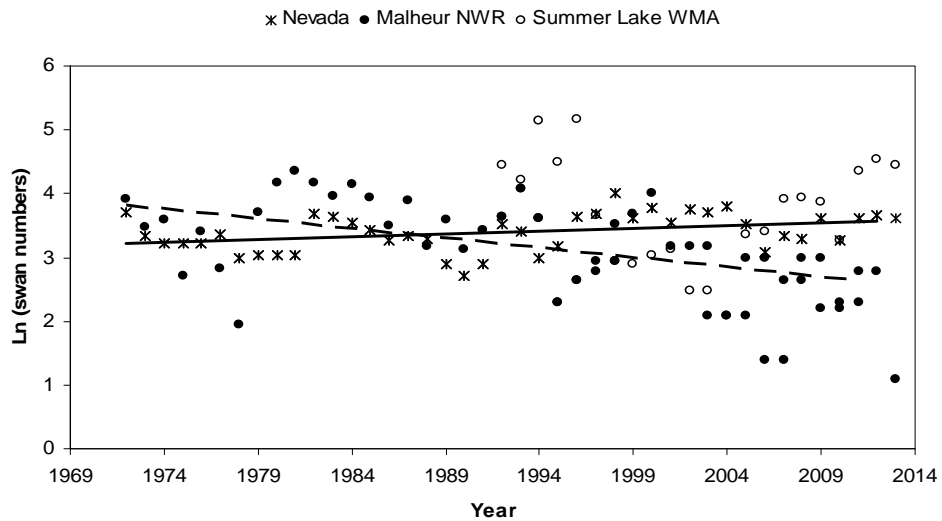


Fig. 8. Rates of change in counts of total swans in Nevada (stars and solid line) and Oregon (Malheur NWR [closed circles and dashed line] and Summer Lake WMA [open circles]) during the Mid-winter Trumpeter Swan Survey, 1972-2013. Data for Summer Lake WMA in 2002 and 2003 are from incomplete surveys.

Table 3. Estimates of swan abundance for flocks comprising the Rocky Mountain Population of Trumpeter swans, 1972-2013.

Year	Mid-winter count	U.S. Breeding Flocks ^a	Canadian Flocks	Percent Canadian Flocks
1972	707	572	135	19.1
1975	763	581	182	23.9
1978	901	544	357	39.6
1981	1345	582	763	56.7
1984	1558	547	1011	64.9
1985	1598	563	1035	64.8
1986	1662	575	1087	65.4
1987	1659	452	1207	72.8
1988	1773	611	1162	65.5
1989	1797	659	1138	63.3
1990	2045	598	1447	70.8
1991	1980	626	1354	68.4
1992	2196	555	1641	74.7
1993	2235	563	1672	74.8
1994	2524	354	2170	86.0
1995	2803	454	2349	83.8
1996	2936	427	2509	85.5
1997	2681	458	2223	82.9
1998	2156	427	1729	80.2
1999	3541	469	3072	86.8
2000	3524	417	3107	88.2
2001	4007	481	3526	88.0
2002	4427	487	3940	89.0
2003	3974	371	3603	90.7
2004	4584	417	4167	90.9
2005	5361	417	4944	92.2
2006	5484	510	4974	90.7
2007	4701	507	4194	89.2
2008	4637	527	4110	88.6
2009	5265	459	4806	91.3

Table 3. (cont.)

Year	Mid-winter count	U.S. Breeding Flocks ^a	Canadian Flocks	Percent Canadian Flocks
2010	4290	473	3817	89.0
2011	5712	484	5228	91.5
2012	6431	480	5951	92.5
2013	6425	593	5832	90.8

^a From U.S. Fish and Wildlife Service 2012*a*. Counts are from the previous calendar year (e.g., the 2013 value is from the Fall 2012 survey).

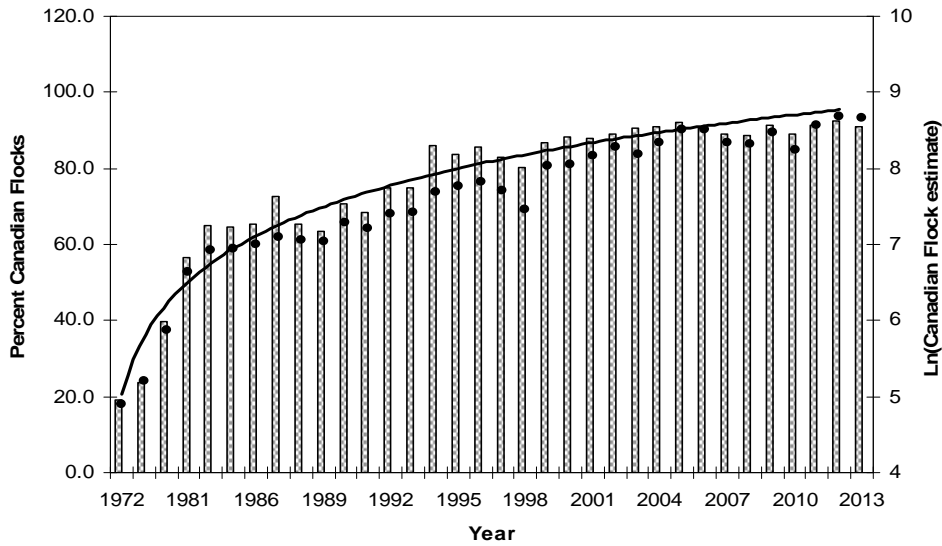


Fig. 9. Percent (bars and solid line) and counts (solid dots) of the entire RMP estimated to be comprised of Canadian Flocks during the Mid-winter Trumpeter Swan Survey, 1972-2013.

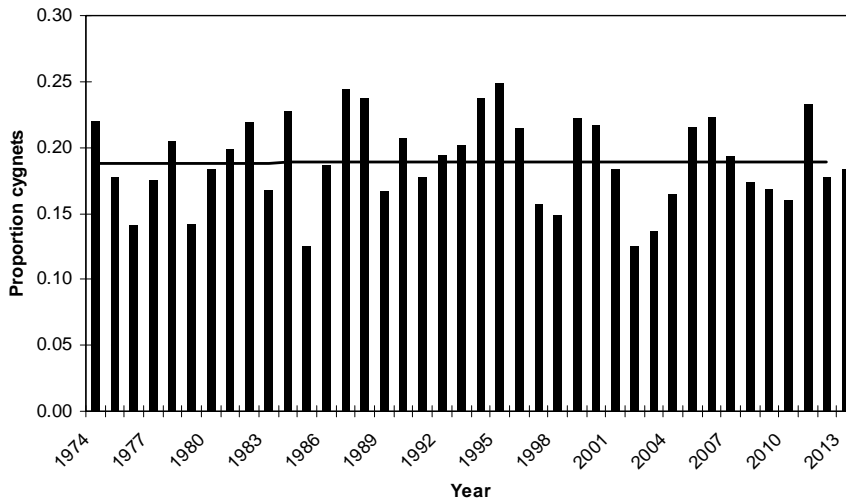


Fig. 10. Proportion of cygnets counted in the tri-state region during the Mid-winter Trumpeter Swan Survey, 1974-2013. The solid line depicts the 1974-2012 average.

Wyoming increased by 80% and 4% respectively. The number of swans in Idaho decreased by 5% but due to 520 birds that were not classified as adults or cygnets during the 2012 winter survey, this decrease may not accurately reflect what is occurring. Of the birds wintering in the tri-state area during winter 2013, about 8% were in Montana, 75% were in Idaho, and 17% were counted in Wyoming.

The number of swans in Nevada (37) was 9% lower than last year (Table 2, Appendix A). The total count was above the long-term average (31 swans). The number of swans counted at Malheur NWR (3) decreased by 80% from last year (Appendix A). The count at Summer Lake WMA (85) was a 9% decrease from last year's record high count (93). The timing of the survey and weather conditions allowed for the swans to disperse and an accurate identification of swans was not possible which could account for the decrease in the number of trumpeter swans (Marty St. Louis personal communication).

The estimated number of swans from Canadian Flocks was 5,832 birds, about 119 less swans compared to the estimate from winter 2012 which was the highest count on record. The estimate indicated about 91% of the RMP counted in winter 2013 was comprised of swans from Canadian Flocks (Table 3, Fig. 9). After increasing steadily from the early 1970s to the late 1990s, the proportion has remained near 90% (range = 88.0%-92.2%) for the last 10 years.

The proportion of cygnets for swans counted in the tri-state region during winter 2013 was 0.183. This value was a 3% decrease from the 1974-2012 average (0.188) (Fig. 10). Cygnet production was up from summer of 2012 due to ideal nesting conditions of plenty of water and slow evaporation rates that kept wetlands productive.

The survey results from the 2013 Mid-winter survey suggest an increase of 114 birds from the count of last year. This was the highest count recorded since the survey began in 1972 and the second count to exceed 6,000 birds. The 1% increase in total swans this year, an 11% increase last year, and the 5.5% increase the year before when compared, with the 19% decrease in the winter count between 2009 and 2010, suggest that factors such as immigration and emigration into and out of the survey area, and potentially changes in annual survival, could influence large change increases and decreases in estimates of annual abundance. However, without additional information regarding these factors, causes for these large and biologically unlikely annual changes will remain unexplained.

Collectively the restoration flocks (Oregon and Nevada) have had successive increases since 1997. However the count for 2013 represents an overall decrease of 30% with Malheur NWR decreasing 80% from the previous year. Weather continues to be an important factor when counting and identifying trumpeter swans in winter.

Editorial Note: A mistake in the number of swans was identified in 2 places in the 2012 Winter Report. The total number of swans reported in Table 1 was 6183. This error has been corrected to 6283. Wyoming's data did not include the 55 swans found in Yellowstone National Park in 2012. The 55 swans have now been added to Wyoming's data and all tables and charts in this report have been updated accordingly.

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Appendix A. Counts of trumpeter swans of the Rocky Mountain Population during winter, 1972-2013.

Year	Montana			Idaho			Wyoming (outside YNP)		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1972	209	14	223	303	14	317	16	4	20
1973	212	28	240	222	58	280	a	a	a
1974	233	40	273	282	109	391	7	0	7
1975	192	32	224	333	94	427	40	2	42
1976	253	34	287	308	67	375	30	1	31
1977	315	43	358	395	126	521	86	0	86
1978	194	68	262	392	96	488	63	4	67
1979	304	26	330	353	81	434	15	3	18
1980	374	80	454	250	70	320	63	6	69
1981	352	36	388	370	110	480	37	10	47
1982	390	90	480	429	137	566	76	19	95
1983	363	59	422	493	122	615	81	12	93
1984	389	109	498	503	162	665	87	11	98
1985	393	31	424	701	144	845	78	8	86
1986	380	73	453	744	183	927	91	25	116
1987	314	63	377	690	255	945	85	18	103
1988	438	153	591	694	209	903	115	28	143
1989	342	90	432	817	141	958	197	39	236
1990	319	38	357	1025	300	1325	169	46	215
1991	385	70	455	918	211	1129	225	47	272
1992	438	114	552	892	249	1141	204	30	234
1993	168	70	238	1020	246	1266	293	64	357
1994	199	48	247	1164	397	1561	253	74	327
1995	153	61	214	1391	475	1866	327	91	418
1996	319	82	401	1336	390	1726	344	84	428
1997	204	30	234	1555	272	1827	346	102	448
1998	290	68	358	1200	200	1400	109	15	124
1999	335	153	488	1754	500	2254	317	71	388

Appendix A. (cont.)

Year	Montana			Idaho			Wyoming (outside YNP)		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
2000	519	155	674	1881	513	2394	207	65	272
2001	373	96	469	2404	549	2953	368	63	431
2002	600	104	704	2636	357	2993	447	72	519
2003	375	58	433	2490	382	2872	354	58	412
2004	583	92	675	2591	563	3154	462	58	520
2005	508	119	627	2954	828	3782	561	166	727
2006	713	211	924	2714	873	3587	655	111	766
2007	466	49	515	2294 ^f	664 ^f	3080	700	155	855
2008	382	25	407	2694 ^f	616 ^f	3321	603	142	745
2009	168	21	189	3393	740	4133	638	110	748
2010	274	64	338	2631	501	3132	630	106	736
2011	307	121	428	3068	918	3986	785	221	1006
2012	262	18	280	3537 ^g	936 ^g	4993	807	148	955
2013	404	101	505	3860	883	4743	880	170	1050

^a Counts not available

^b Total counts not separated into white birds and cygnets prior to 1992.

^c Swans first translocated to Summer Lake WMA in 1992.

^d Count biased low because aerial survey not conducted due to hazardous weather; snowmobile count with incomplete coverage only.

^e Count biased low due to incomplete survey coverage.

^f Counts biased low because 122 birds in 2007 and 11 birds in 2008 not classified as white birds or cygnets.

^g Counts biased low because 520 birds in Rexburg, Idaho were not classified as white birds or cygnets.

Appendix A. (cont.)

Year	Yellowstone NP			Malheur NWR ^b			Summer Lake WMA ^c			Nevada ^b		
	White			White			White			White		
	birds	Cygnets	Total	birds	Cygnets	Total	birds	Cygnets	Total	birds	Cygnets	Total
1972	a	a	56			50						41
1973	a	a	61			32						28
1974	31	7	38			36						25
1975	30	0	30			15						25
1976	32	0	32			30						25
1977	43	9	52			17						29
1978	46	11	57			7						20
1979	71	13	84			41						21
1980	80	16	96			65						21
1981	241	91	332			77						21
1982	57	20	77			65						40
1983	88	14	102			52						38
1984	149	50	199			63						35
1985	154	7	161			51						31
1986	89	18	107			33						26
1987	107	50	157			49						28
1988	67	18	85			24						27
1989	96	21	117			36						18
1990	78	32	110			23						15
1991	61	14	75			31						18
1992	108	4	112	25	13	38	42	43	85	32	2	34
1993	178	39	217	44	15	59	47	21	68	30	0	30
1994	137	24	161	30	7	37	84	87	171	13	7	20
1995	141	41	182	9	1	10	63	26	89	21	3	24
1996	130	24	154	11	3	14	129	46	175	23	15	38
1997	74	3	77	11	5	16	35	4	39	31	9	40
1998	157 ^d	24 ^d	181 ^d	13	6	19	18	1	19	33	22	55
1999	292	48	340	a	a	16	16	2	18	29	8	37
2000	87	13	100	a	a	19	15	6	21	35	9	44

Appendix A. (cont.)

Year	Yellowstone NP			Malheur NWR ^b			Summer Lake WMA ^c			Nevada ^b		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
2001	53	11	64	a	a	32	16	7	23	31	4	35
2002	131	13	144	a	a	12	7 ^e	5 ^e	12 ^e	41	2	43
2003	146	34	180	19	5	24	9 ^e	3 ^e	12 ^e	34	7	41
2004	149	33	182	8	0	8	a	a	a	38	7	45
2005	124	30	154	8	0	8	19	10	29	32	2	34
2006	121	14	135	15	5	20	21	9	30	22	0	22
2007	144	25	169	4	0	4	34	16	50	18	10	28
2008	65	7	72	12	2	14	37	14	51	25	2	27
2009	88	2	90	17	3	20	36	12	48	37	0	37
2010	18	5	23	7	2	9	14	12	26	26	0	26
2011	125	42	167	7	3	10	59	19	78	33	4	37
2012	51	4	55	13	3	16	77	16	93	36	3	39
2013	2	0	2	3	0	3	67	18	85	28	9	37

^a Counts not available

^b Total counts not separated into white birds and cygnets prior to 1992.

^c Swans first translocated to Summer Lake WMA in 1992.

^d Count biased low because aerial survey not conducted due to hazardous weather; snowmobile count with incomplete coverage only.

^e Count biased low due to incomplete survey coverage.

^f Counts biased low because 122 birds in 2007 and 11 birds in 2008 not classified as white birds or cygnets.

^g Counts biased low because 520 birds in Rexburg, Idaho were not classified as white birds or cygnets.

Appendix B. Site-specific counts of trumpeter swans of the Rocky Mountain Population during the Mid-winter Trumpeter Swan Survey, 2013

State or Area	White birds	Cygnets	Total	Pilot/observer/notes
Montana				
<i>Hebgen Lake area</i>				P: N. Cadwell; O: D. Smith (2/11)
Cougar Creek	0	0	0	
Between Quake Lake and Hebgen Lake	0	0	0	
Madison River Arm	225	55	280	
North Spring (Grayling Arm)	0	0	0	
South Fork Arm	56	20	76	
South Fork Madison River/Buttermilk Creek	0	0	0	
Subtotal	281	75	356	
<i>Madison River Valley</i>				P: D. Chapman; O: Bill West (2/5)
Odell Creek Area	39	3	42	
Walsh Ponds (south)1	0	0	0	
Walsh Ponds (north)1	0	0	0	
Madison River, south of Ennis	27	6	33	
Madison River, north of Ennis	0	0	0	
Ennis Lake	10	4	14	
Subtotal	76	13	89	
<i>Chain of Lakes</i>				
Cliff Lake	11	3	14	
Wade Lake	0	0	0	
Goose Lake	0	0	0	
Smith Creek (Hidden Lake outlet)	6	3	9	
Subtotal	17	6	23	
<i>Centennial Valley/Red Rock Lakes NWR</i>				
Red Rock River below Lower Lake Dam	0	0	0	
MacDonald Pond	0	0	0	
Culver Pond	2	0	2	
Elk Springs Creek	7	3	10	
Swan Lake	0	0	0	
Shamow Pond	0	0	0	
Red Rock River, Lima	0	0	0	
Subtotal	9	3	12	
<i>Paradise Valley</i>				P: S Ard; O: D. Smith (2/11)
Armstrong's Spring Creek	0	0	0	
Bailey's	0	0	0	
Brockway	0	0	0	
DePuys	12	1	13	
Brandis	0	0	0	

Nelson's Spring Creek	0	0	0	
Paradise Valley Airport	0	0	0	
Emigrant	7	2	9	
Beaver Creek	0	0	0	
Yellowstone River - south of Emigrant	2	1	3	
Yellowstone River - Pray	0	0	0	
Yellowstone River - Pine Creek	0	0	0	
Dana's	0	0	0	
Emigrant Pond	0	0	0	
PMD Ranch	0	0	0	
Subtotal	21	4	25	
MONTANA TOTAL	404	101	505	
Wyoming				
<i>Upper Snake River (Flagg Ranch to Wilson Bridge)</i>				P: D. Stinson; O: S. Patla (2/4 - 2/5)
Polecat Creek	0	0	0	
Flagg Ranch to Jackson Lake	2	5	7	
Jackson Lake	11	0	11	Includes 3 birds Swan Lake slough
Jackson Lake to Moran Junction	32	0	32	
Moran Junction to Deadman's	0	0	0	
Deadman's to Moose	39	2	41	
Moose to Gros Ventre Junction	65	20	85	
Gros Ventre Junction area	31	3	34	
Gros Ventre Junction to Wilson Bridge	10	4	14	
Gros Ventre River, Highway 89 to Snake River	0	0	0	
Subtotal	190	34	224	
<i>Gros Ventre River upriver of Kelly</i>				
Kelly Warm Springs, Grand Teton National Park				
Lower Slide Lake				
Upper Gros Ventre				
Subtotal	0	0	0	
<i>Lower Snake River (Wilson Bridge to Alpine)</i>				
Wilson Bridge to South Park Bridge	114	32	146	
Evan's Gravel pit ponds	17	6	23	
South Park Bridge to Hoback	2	0	2	
North Wilson	11	7	18	
Fish Creek, Wilson to Snake River	36	6	42	
Boyles Hill area	40	20	60	ground count WWS
Spring Creek	11	0	11	
Crane Creek	5	0	5	
Lower Flat Creek, Snake River to Jackson	11	1	12	
Rafter J Ponds	1	2	3	
Valley Springs, Captive Swan Pond/Pen Highway 89	21	2	23	ground count WWS
Hoback to Astoria Bridge	0	0	0	

Astoria Bridge-Elbow	13	3	16	
Elbow to Alpine/Palisades Reservoir	9	0	9	
Bailey Lake	2	0	2	
Kelly Swan Facility	0	0	0	
Bondurant pond near Hoback River	4	0	4	ground report
Subtotal	297	79	376	
<i>National Elk Refuge</i>				
Flat Creek main marsh	34	2	36	
Gros Ventre River, Kelly to Highway 89	25	5	30	Bill's Bayou
Romney pond area	0	0	0	
Lost Spring	2	0	2	
Subtotal	61	7	68	
<i>Salt River (Alpine to Afton)</i>				
Palisades Reservoir, WY Alpine	0	0	0	frozen
Palisades Reservoir to Freedom Road	33	5	38	
Freedom Road to Narrows	29	3	32	
Thayne area	0	0	0	
Narrows to Grover/Auburn Highway	18	2	20	
Grover/Auburn Highway to Swift Creek	40	10	50	
Swift Creek to Headwaters	0	0	0	
Subtotal	120	20	140	
<i>Pinedale</i>				
				flown 2/6
New Fork Boulder to Pinedale	0	0	0	
Boulder Fish Hatchery	0	0	0	
Daniel Fish Hatchery/Forty Rod Creek	6	5	11	
Warren Bridge to Kendall Bridge, Green River	2	0	2	
Kendall Bridge to Green River Lakes	0	0	0	frozen
Subtotal	8	5	13	
<i>Green River (Warren Bridge to Highway 28 Bridge)</i>				
				flown 2/6
Fontenelle Dam-CCC Bridge	15	3	18	
CCC Bridge to Pilot Farm	108	9	117	
Pilot Farm-Refuge Headquarters	81	13	94	
Refuge to Big Sandy	0	0	0	Stopped here; river frozen
Big Sandy to Big Island				not flown
Flaming Gorge Reservoir				not flown
Subtotal	204	25	229	
<i>Dubois area</i>				
				ground survey 2/4
Wind River and spring ponds, Dubois	4	3	7	reported in area
Dinwoody Lake	11	5	16	Pat Hnilicka, Eva Crane
Bull Lake	0	0	0	Pat Hnilicka, Eva Crane
Wind River, Dinwoody to Crowheart				not flown

Subtotal	15	8	23	Belongs in Central Flyway and not part of
<i>Yellowstone National Park</i>				
Slough Creek	0	0	0	P: N. Cadwell; O: D. Smith (2/11)
Tern Lake	0	0	0	
Broad Creek, near White Lake	0	0	0	
White Lake	0	0	0	
Beach Springs Lagoon	0	0	0	
Shoshone Geyser Basin	0	0	0	
Lewis River	0	0	0	
Buela Lake	0	0	0	
Yellowstone River	0	0	0	
Yellowstone River - Fishing Bridge	0	0	0	
Lewis Lake	0	0	0	
Falls River	0	0	0	
Shoshone Lake	0	0	0	
Bechler Lake	0	0	0	
Bourndary Creek	0	0	0	
Bechler River	0	0	0	
Firehole River	2	0	2	
Madison River (Madison Jct. to Park boundary)	0	0	0	
Richard's Pond	0	0	0	
Gibbon Meadow	0	0	0	
Nymph Lake	0	0	0	
Elk Park	0	0	0	
North Twin Lake	0	0	0	
Nez Perce Creek near Culex Basin	0	0	0	
Nez Perce Creek near Cowan Creek	0	0	0	
Alum Creek	0	0	0	
Gibbon River north of Madison Junction	0	0	0	
Mud Volcano	0	0	0	
Subtotal	2	0	2	
TOTAL WY outside YNP	880	170	1050	
TOTAL WY including YNP	882	170	1052	
Idaho				
				P: R, Spangler; O:P. Johnson, J. Braastad (2/12, 2/14)
<i>Island Park Area</i>				
Warm Springs (west side of Henrys Lake)				frozen
Henrys Lake flats				frozen
Big Springs, North Fork, Mack's Inn Area				not flown due to weather
Mack's Inn to Island Park Reservoir				not flown due to weather
Island Park Reservoir				frozen
Island Park Reservoir inlet				frozen
Trude Ranch Pond				frozen
Icehouse Reservoir				frozen
Sheridan Creek, mouth to Sheridan Reservoir				frozen
Sheridan Reservoir				not flown due to weather

Sheridan Creek cabin and pond				not flown due to weather
Subtotal	0	0	0	
<i>Buffalo River Area</i>				
Buffalo River	6	2	8	IDFG grd srv-not flown due to weather
Tom's Creek				not flown due to weather
Elk Creek/Trudes Siding pond				not flown due to weather
Subtotal	6	2	8	
<i>Harriman State Park (HSP) Area</i>				
Island Park Dam through Box Canyon				not flown due to weather
Box Canyon - HSP north boundary	39	5	44	IDFG grd srv-not flown due to weather
HSP north bounday - Osborne bridge	101	13	114	IDFG grd srv-not flown due to weather
Golden Lake	26	6	32	IDFG grd srv-not flown due to weather
Thurmon Creek	20	6	26	IDFG grd srv-not flown due to weather
Silver Lake	5	1	6	IDFG grd srv-not flown due to weather
Osborne Bridge - Pinehaven	9	1	10	IDFG grd srv-not flown due to weather
Pinehaven	75	0	75	IDFG grd srv-not flown due to weather
Fish Pond	0	0	0	IDFG grd srv-not flown due to weather
Henrys Fork below Pinehaven - Forest boundary				not flown due to weather
Subtotal	275	32	307	
<i>Henrys Fork, HSP to Warm River</i>				
Warm River				not flown due to weather
Subtotal	0	0	0	
<i>Lower Henrys Fork Area</i>				
Warm River confluence to Ashton Dam	37	10	47	
Ashton Dam to Chester Dam	45	23	68	
Chester Dam to Highway 33	46	15	61	
Highway 33 - Menan Buttes	0	1	1	
Ashton Ponds	0	0	0	frozen
Willow Creek Area farmstead ponds	32	4	36	
Mikesell Reservoir 1 & 2	0	0	0	frozen
Arcadia Reservoir, Upper	0	0	0	frozen
Arcadia Reservoir, Lower	0	0	0	frozen
Sand Creek WMA and area	16	3	19	
Singleton Ponds	0	0	0	
Texas Slough	0	0	0	
Bannock Jim Slough	4	1	5	
Mud Lake WMA				frozen not flown
Camas NWR				frozen not flown
Camas Creek				dry not flown
Subtotal	180	57	237	
<i>Teton River Basin</i>				

Teton River to Wilford Dam	35	12	47	
Wilford Dam to Newdale Bridge	223	35	258	
Newdale Bridge to Teton Dam site	50	12	62	
Teton River Canyon	33	6	39	
Teton Basin	87	21	108	
North Fork Teton River				
South Fork Teton River	4	2	6	
Subtotal	432	88	520	
<i>South Fork of the Snake River</i>				
Swan Valley (Palisades Reservoir to Conant Valley)	27	18	45	
Canyon (Conant to Heise)	27	23	50	
Delta (Heise to Menan Buttes)	16	6	22	
Dry bed (Heise to Menan)	0	0	0	Dry
Subtotal	70	47	117	
<i>Main Stem of the Snake River</i>				
Menan Buttes to Idaho Falls	79	31	110	
Deer Park WMA and adjacent properties	1288	237	1525	IDFG grd srv; count reflects min number of field feeders
Idaho Falls to Fort Hall (Ferry Butte)	59	12	71	
Blackfoot Marsh				frozen not flown
Market Lake WMA	4	3	7	field feeders
Subtotal	1430	283	1713	
<i>Fort Hall Bottoms to American Falls Reservoir</i>				
American Falls Reservoir shoreline	770	120	890	
Kinney Creek	0	0	0	
Portneuf River (Am. Falls Res. to Hwy 86)	0	0	0	
Mouth of Portneuf River	0	0	0	
Spring Creek to American Falls Reservoir	0	0	0	
Jimmie Creek	0	0	0	
Snake River - Tilden Bridge	8	0	8	
Clear Creek and Ross Fork	0	0	0	
Diggie Creek	0	0	0	
Jeff Cabin Creek	0	0	8	
Flying Y oxbows	0	0	0	
Field Feeding - Ft Hall Ag Lands	413	168	581	ShoBan D. Christopherson grd srv 2/12
Field Feeding - Ag. Lands N Sterling	10	14	24	IDFG Wackenhut grd srv 2/12
Field Feeding - Legacy springs	2	0	2	ShoBan D. Christopherson grd srv 2/12
Subtotal	1203	302	1513	
<i>Snake River below American Falls Dam</i>				
Springfield Reservoir	0	0	0	
American Falls Reservoir (except Fort Hall)	0	0	0	
American Falls Dam - Minidoka NWR	0	0	0	
Minidoka NWR				frozen not flown

Minidoka Dam - C.J. Strike Reservoir				not surveyed
Hagerman National Fish Hatchery				not surveyed
Bruneau Dunes State Park				not surveyed
Bruneau Dunes - C.J. Stike Reservoir				not surveyed
Faulkner Pond				not surveyed
White Arrow Pond (Bliss)				not surveyed
Pioneer Reservoir (King Hill)				not surveyed
Snake River at King Hill				not surveyed
Silver Creek (Picabo area)	35	13	48	Cameron grd srv 2/13
Mirracle Hot Springs				not surveyed
Dead Horse Lake				not surveyed
Butler Pond				not surveyed
Subtotal	35	13	48	
<i>Grays Lake NWR Area</i>				
Big Springs				frozen not flow
Shorty's Homestead				frozen not flow
Blackfoot Reservoir	0	0	0	
Chub Springs, southwest of refuge	9	0	9	
Spring Creek	6	2	8	
Chesterfield Reservoir				frozen not flow
Chesterfield Reservoir Canal (portneuf R. headwaters)				frozen not flow
Grimm Spring and channel				frozen not flow
U. Portneuf river: Toponce Rd - Pebble Cr Rd	18	4	22	
Pebble Cr Rd - Broxon Rd	0	0	0	
Broxon Rd - Symons Rd	4	2	6	
Symons Rd - Blazer Hwy. Bridge	9	1	10	
Blazer Hwy. bridge - Hwy 30 Bridge	0	0	0	
Subtotal	46	9	55	
<i>Soda Springs Area</i>				
Woodall Springs	0	0	0	
Alexander Reservoir and Siding	0	0	0	
Miller Ponds	0	0	0	
Government Dam	6	1	7	
Soda Creek	10	0	10	
Soda Canal	0	0	0	
Subtotal	16	1	17	
<i>Bear River Reaches</i>				
Alexander Reservoir				frozen, not flown
Alexander Reservoir - Gentile Valley Bridge	102	30	132	
Gentile Valley Bridge - old cheese factory	0	0	0	
Gentile Valley Bridge to Oneida Dam	34	8	42	
Montpelier Reserveroir (rearing pond)				frozen, not flown

Oneida Narrows				
Oneida Narrows to Riverdale Bridge	15	4	19	
Riverdale Bridge to Utah border	16	7	23	
Subtotal	167	49	216	
<i>Bear Lake National Wildlife Refuge</i>				
Bear Lake - Alexander Res.				
West Canal Unit				
Rainbow Unit				
Outlet Canal				
Subtotal	0	0	0	
IDAHO TOTAL	3860	883	4743	
Utah				
Round Valley (S end of Bear Lake)				
Nevada				
Ruby Lake NWR	28	9	37	G. Wagner (2/2)
Franklin Lake				
Oregon				
<i>Malheur NWR</i>				
Refuge total	3	0	3	J. Dastyck (1/31)
<i>Summer Lake Wildlife Management Area</i>				
Summer Lake WMA	67	18	85	M. St. Louis (2/6)

^aBlank denotes area not surveyed.

Appendix C. Personnel who conducted the 2013 Mid-winter Trumpeter Swan Survey.

Montana (Red Rock Lakes NWR, Centennial Valley, Madison Valley)

Observer: B. West (Red Rock Lakes NWR)

Pilot: D. Chapman

Montana (Hebgen Lake Area and Paradise Valley)

Observer: D. Smith (Yellowstone National Park)

Pilot: N. Cadwell (Elkhorn Aviation)

Idaho

Observer: P. Johnson and J. Braastad (Southeast Idaho National Wildlife Refuge Complex)

Pilot: R. Spangler USFWS pilot/biologist

Wyoming

Observer: S. Patla (Wyoming Game and Fish Department)

Pilot: D. Stinson (Sky Aviation)

Wyoming (Yellowstone National Park)

Observer: D. Smith (Yellowstone National Park)

Pilot: N. Cadwell (Elkhorn Aviation)

Ruby Lake NWR and vicinity

G. Wagner (Ruby Lake NWR)

Malheur NWR

J. Dastyck (Malheur NWR)

Summer Lake WMA

M. St. Louis (Oregon Department of Fish and Wildlife)
