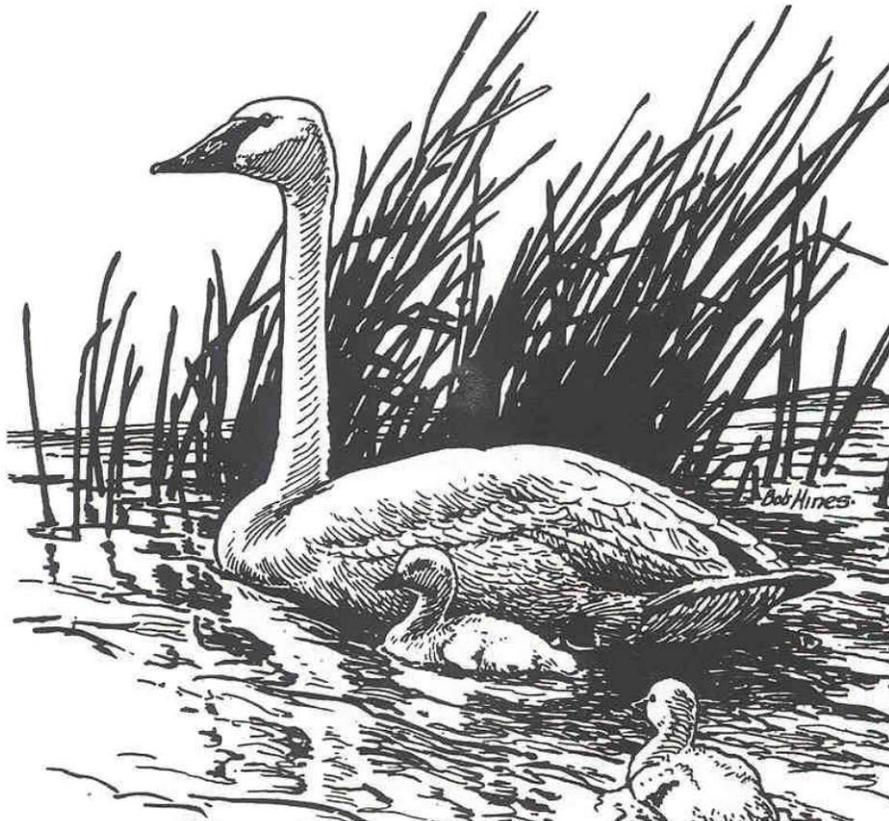




U.S. Fish and Wildlife Service

# Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment

*Fall 2013*



## **ACKNOWLEDGMENTS**

We would like to especially thank the personnel who conducted the surveys, a list of whom is provided in Appendix B. The survey was a collaborative effort among Red Rock Lakes NWR, Migratory Birds and State Programs -- Mountain-Prairie Region of the U.S. Fish and Wildlife Service, the Division of Migratory Bird Management, 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, Montana Fish Wildlife and Parks, Wyoming Game and Fish Department, Ruby Lake NWR, Oregon Department of Fish and Wildlife, Malheur NWR, and the Shoshone-Bannock Tribes.

**TRUMPETER SWAN SURVEY**  
**of the**  
**ROCKY MOUNTAIN POPULATION,**  
**U.S. BREEDING SEGMENT**

**FALL 2013**

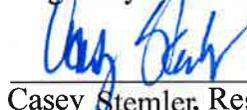
U.S. Fish and Wildlife Service  
Migratory Birds and State Programs  
Mountain-Prairie Region  
Lakewood, Colorado

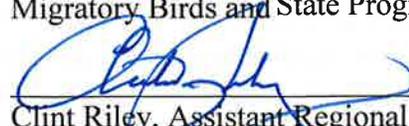
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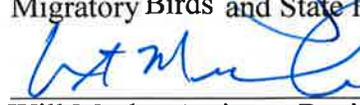
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*Abstract* – Observers counted 606 swans (white birds and cygnets) in the U.S. Breeding Segment of the Rocky Mountain Population of trumpeter swans during fall of 2013, a 2.2% increase from last year's count (593). The number of white birds in the Tri-state region (451) increased 18% from last year's count of 381. The total number of cygnets decreased 38.2%, from 178 in 2012 to 110 in 2013. Cygnet counts decreased from 2012 by 72.9% and 6.7% for Montana and Idaho, respectively, while Wyoming cygnet production remained the same as last year at 52. Malheur National Wildlife Refuge (NWR) did not conduct the swan survey this year. Twenty-four white birds were observed at the Summer Lake Wildlife Management Area, which was an increase of 41.2% from last year. Nevada counted 20 swans on this year's survey. Precipitation throughout most of the Tri-state Area was 65% – 85% of normal during winter 2012 - 2013. During the summer months, temperatures were 1 – 3 °F warmer than average and precipitation was 25 – 50% of normal, especially during June - August. Palmer Drought Indices for areas within the Tri-state region declined for the second year for 2013.

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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 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 RMP/Canadian and Tri-state Area flocks winter sympatrically primarily in the Tri-state area. In addition, efforts have been made to establish several restoration flocks, such as those at Ruby Lake 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. This report contains information only from the Tri-state Area and restoration flocks, collectively referred to as the RMP/U.S. Breeding Segment. 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).

The Fall Trumpeter Swan Survey is conducted annually in September. The survey is conducted cooperatively by several administrative entities and is intended to provide an accurate count of the number of RMP trumpeter swans that summer in the U.S. The history of the survey dates back to the 1930s, although methods and survey coverage have changed over time as the number of swans increased and new technologies became available. To be consistent with previous reports, only data from 1967 to present were analyzed for this report. The data are used by managers to assess the annual status of the Tri-state Area Flocks and restoration flocks.

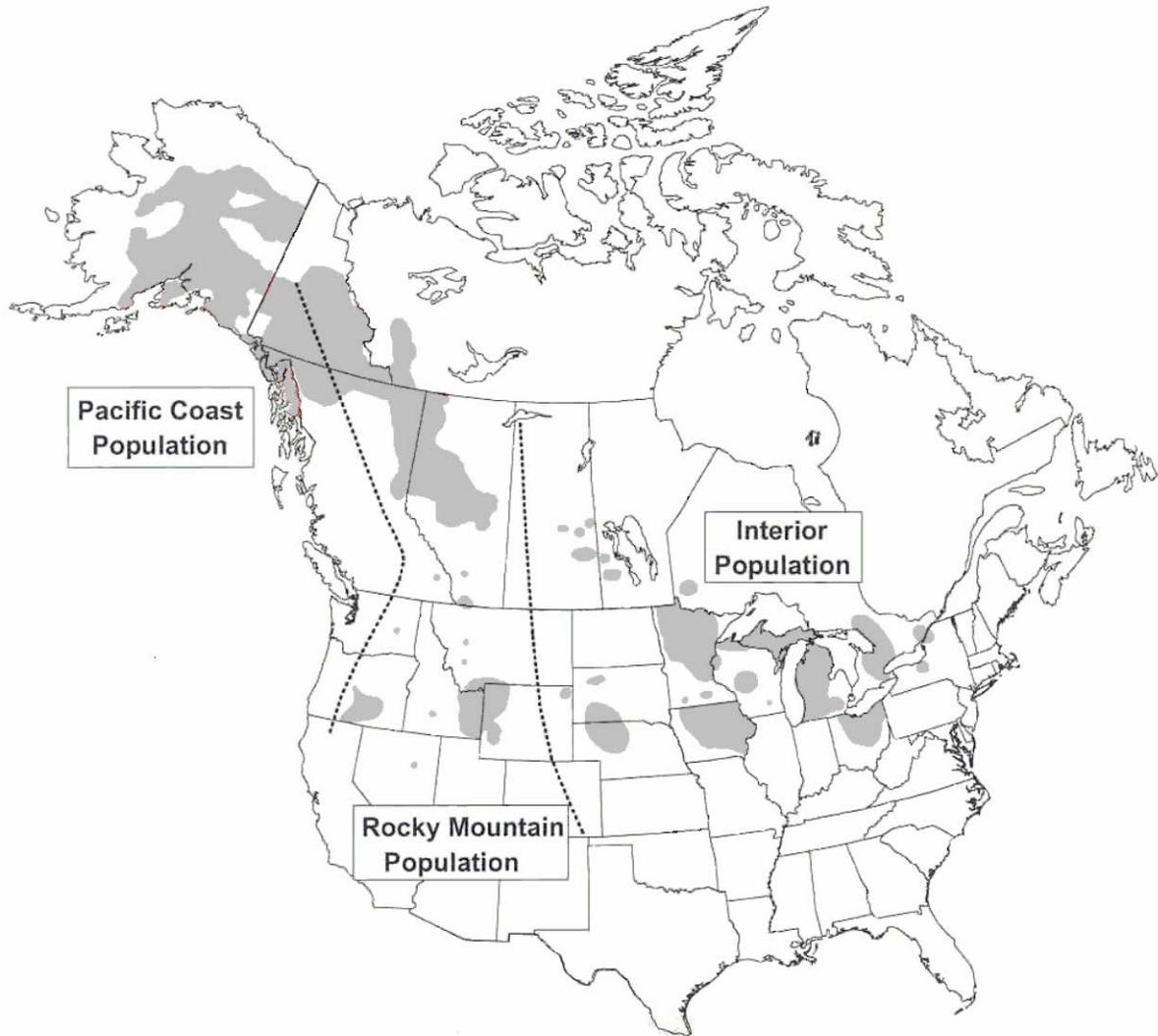


Fig. 1. Approximate ranges of trumpeter swans during summer (from Moser 2006).

# Greater Yellowstone Ecosystem

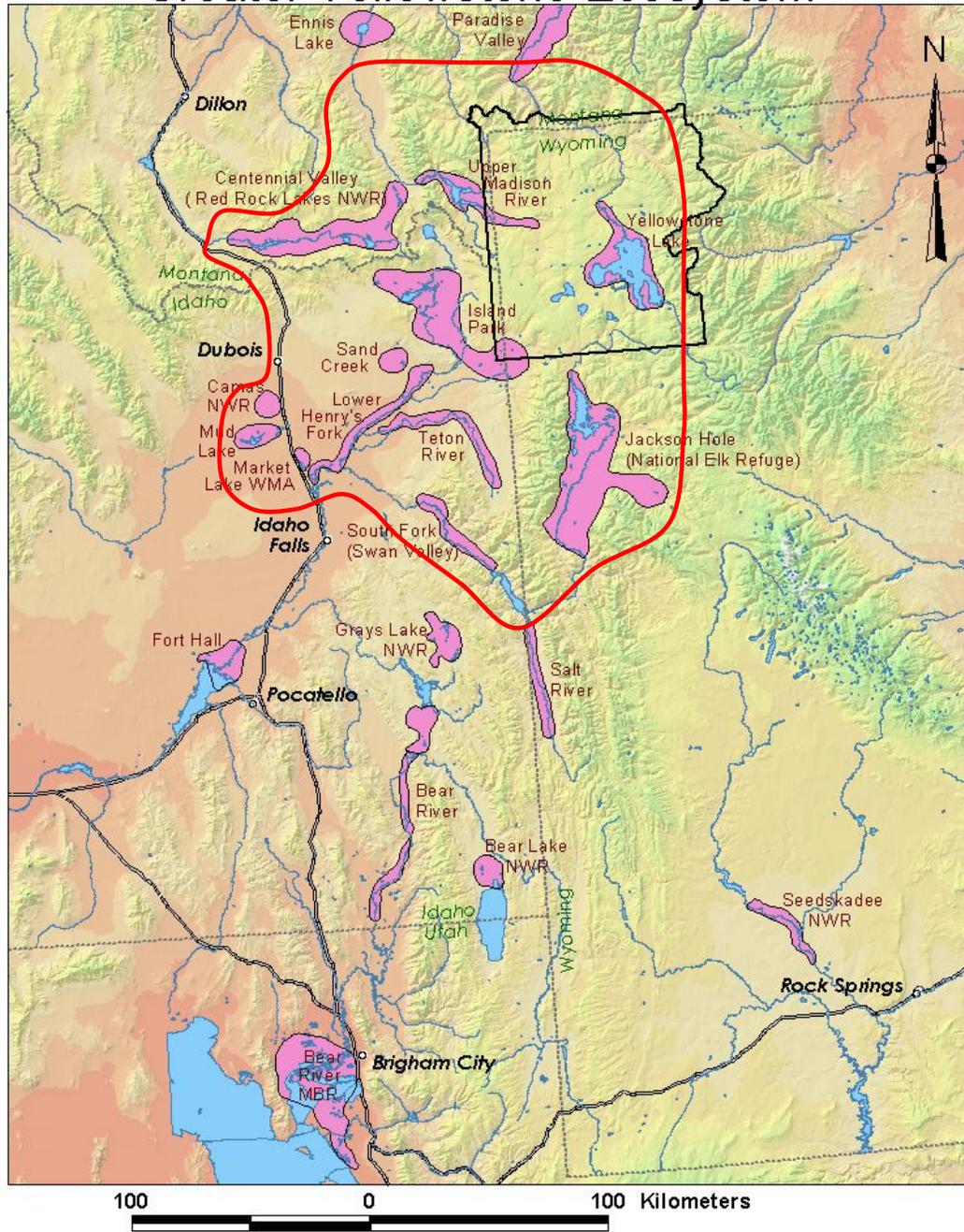


Fig. 2. Map showing the 'core' tri-state area (inside of red line) of southeast Idaho, southwest Montana, and northwest Wyoming (Dr. Rick Sodja and Lisa Landenburger, USGS, NRMSC, Bozeman, Montana).

## **METHODS**

The survey is conducted within a relatively short time frame to reduce the possibility of counting swans more than once due to movements of birds among areas. Aerial cruise surveys and ground surveys are used to count numbers of swans in the Tri-state Area, in Nevada, Malheur NWR, and at the Summer Lake WMA and vicinity; ground surveys also 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 summer 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.

During fall 2013, all areas within the Tri-state region were surveyed during 11-23 September. This year in Idaho the swan flight was again combined with the September Sandhill crane survey which led to a longer flight time, but otherwise did not detract from counting swans. Approximately 47 h of flight time and additional ground survey time were required to complete the survey. Weather conditions during surveys consisted of overcast skies, moderate to strong winds, periods of heavy, and periods of stormy weather which delayed some flights. Temperatures ranged in the 40's °F during the flights. Ruby Lake NWR and Summer Lake WMA also conducted surveys, but Malheur NWR did not.

We used least-squares regression on log-transformed counts to assess changes in growth rates for each of the swan flocks comprising the RMP/U.S. Breeding Segment. The regression analysis included only data collected within the traditional surveyed areas. Counts from the current fall survey (2013) were compared to results from the earlier time frames, a practice used in U.S. Fish and Wildlife Service survey reports for other waterfowl (e.g., U.S. Fish and Wildlife Service 2013, Zimpfer et al. 2013).

## **RESULTS AND DISCUSSION**

Overall during winter 2012-13, areas within the summer range of the Tri-state Area Flocks received near average precipitation (85% of normal). For the winter period, the temperature for much of the survey region was at the long term average (Joint Agricultural Weather Facility 2013a). Average temperatures occurred throughout the region during spring, but Idaho and Montana received below-average precipitation (Joint Agricultural Weather Facility 2013b). By mid-summer precipitation for the area was about 50% of normal while temperatures were 3 °F above average (Joint Agricultural Weather Facility 2013c). During mid-June, landscape conditions ranged from abnormally dry to severe drought across the survey area (Fig. 3). The Palmer Drought Index for southwestern Montana (near the north-central portion of the core tri-state area) during summer declined again for the second year (Fig. 4).

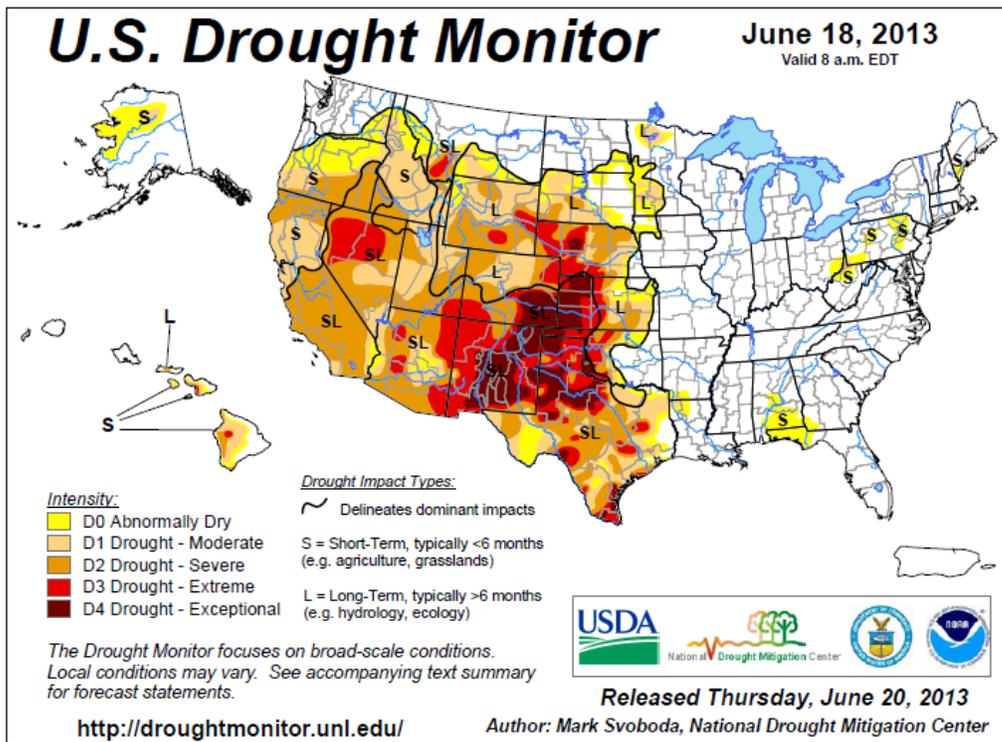


Fig. 3. Palmer Drought Index map for June 18, 2013 (Joint Agricultural Weather Facility 2013d).

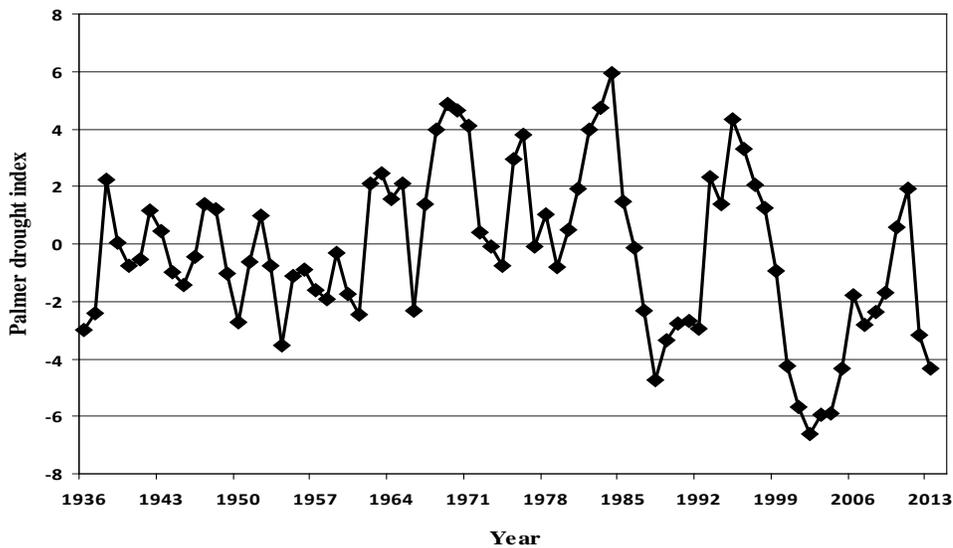


Fig. 4. Monthly Palmer Drought Indices for climate division 2 in southwest Montana (data from the National Climatic Data Center [<http://www1.ncdc.noaa.gov/pub/data/cirs/drd964x.pdsi.txt>]).

## Historical Trends

Historical (i.e., 1967 to the early 1990s) trends in abundance for the U.S. Breeding Segment of RMP trumpeter swans were described in a previous report (U.S. Fish and Wildlife Service 2003), and the details of those analyses will not be reiterated here. Briefly, regression analyses suggested that the growth rate for total swans of the entire U.S. Breeding Segment did not change ( $P = 0.27$ ) during 1967-88 (Table 1, Fig. 5). The rate for white birds appeared to decline slightly (-0.8% per year,  $P [\beta < 0] = 0.16$ ), while that for cygnets showed no trend ( $P = 0.50$ ). Patterns for regression statistics for the Tri-state Area Flocks were similar to those for the RMP/U.S. Breeding Segment (Fig. 6), because the vast majority of birds comprising the RMP/U.S. Breeding Segment summer in the Tri-state Area (Table 1). However, the counts of white swans appeared to decline at a somewhat greater rate (-1.0% per year,  $P = 0.09$ ) during 1967-88, compared to those for white birds in the entire RMP/U.S Breeding Segment.

Birds summering in Montana (Table 2) had patterns of change relatively similar to that of the Tri-state Area Flocks as a whole, because historically the swans in Montana comprised the majority of birds in the Tri-state Area Flocks. Total swans in Montana appeared to decline slightly (-1.2% per year) during 1967-88 (Fig. 7), although the value for the slope parameter was only marginally significant ( $P = 0.16$ ). The decline existed only for white birds; counts for cygnets suggested no trend ( $P = 0.95$ ). In Idaho, no trends in total or white swan counts were evident, but the counts for cygnets increased ( $P = 0.03$ ) (Fig. 8). No trends in swan counts were evident in Wyoming (Fig. 9).

For restoration flocks, we analyzed data only for Malheur NWR (Oregon flock) and Ruby Lake NWR. Swans were translocated to Summer Lake WMA (Oregon flock) beginning in winter 1991; therefore, data for that area prior to that time are not available. Plots of the swan counts for total birds and white birds at Malheur NWR suggested that a piecewise regression with a breakpoint at 1983 would fit the data better than a simple linear regression. For the period 1967-1983, no trend was evident in counts of total swans or white birds ( $P \geq 0.17$ ) (Fig. 10). During 1984-1991, rates for total birds and white birds were negative but not statistically significant ( $P \geq 0.15$ ). No trend in the rate for cygnets was evident for either time period ( $P \geq 0.45$ ). Counts for the Nevada flock ranged between 6 and 42 birds (Table 2), with no apparent long-term trends (Fig. 11).

Complete surveys of the Summer Lake WMA have not been conducted consistently since 2001. Therefore, analyses using post-1991 data for the RMP exclude counts for that area so that areas surveyed were comparable across years. As a consequence, some results may differ from previous reports.

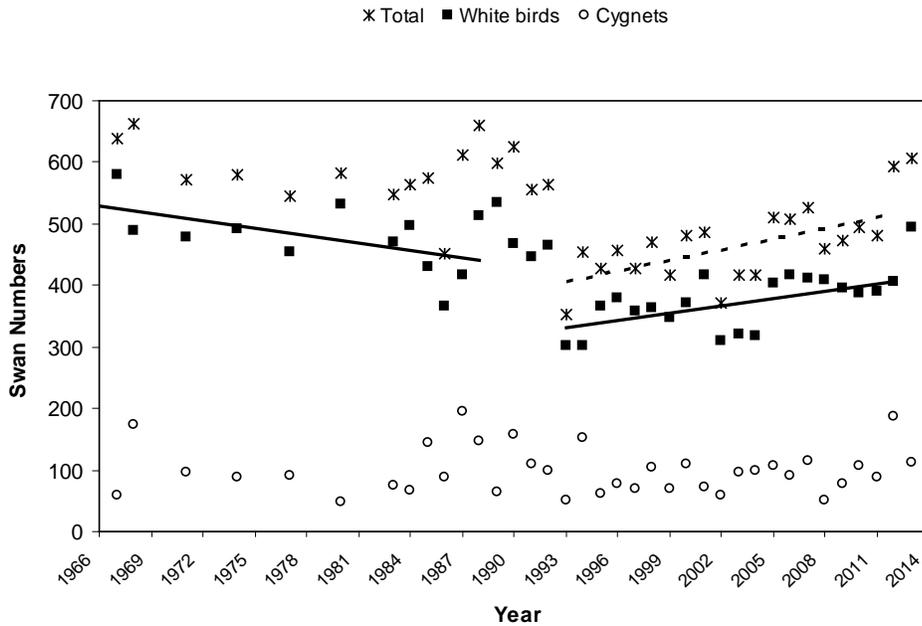


Fig. 5. Counts of swans in the RMP/U.S. Breeding Segment during the Fall Trumpeter Swan Survey, 1967-2013 (dotted and solid lines depict trends for total swans and white birds, respectively).

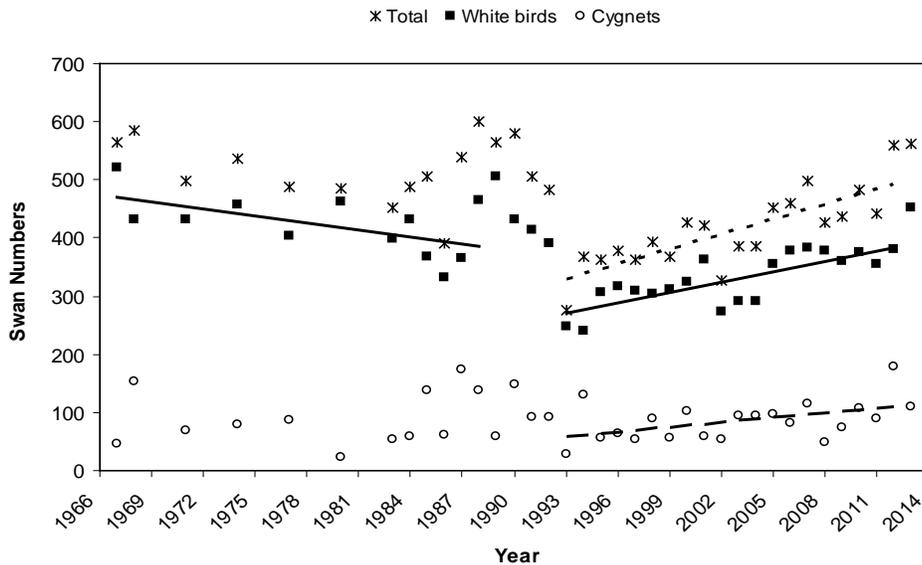


Fig. 6. Counts of swans in the Tri-state Area Flocks during the Fall Trumpeter Swan Survey, 1967-2013 (dotted, solid and dashed lines depict trends for total swans, white birds, and cygnets, respectively).

Table 1. Counts of trumpeter swans of the Rocky Mountain Population U.S. Breeding Segment during fall, 1967-2013.

Year	<u>Tri-state Area Flocks</u>			<u>Restoration flocks</u>			<u>RMP/U.S. Breeding Segment</u>		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1967	520	45	565	60	13	73	580	58	638
1968	431	154	585	58	20	78	489	174	663
1969	a			69	23	92			
1970				45	16	61			
1971	431	68	499	46	27	73	477	95	572
1972				42	16	58			
1973				42	7	49			
1974	457	80	537	35	9	44	492	89	581
1975				41	9	50			
1976				31	9	40			
1977	403	86	489	51	4	55	454	90	544
1978				39	15	54			
1979				41	42	83			
1980	462	23	485	71	26	97	533	49	582
1981				77	14	91			
1982				56	20	76			
1983	398	54	452	73	22	95	471	76	547
1984	431	58	489	65	9	74	496	67	563
1985	368	139	507	63	5	68	431	144	575
1986	331	61	392	34	26	60	365	87	452
1987	365	175	540	52	19	71	417	194	611
1988	464	137	601	49	9	58	513	146	659
1989	505	60	565	30	3	33	535	63	598
1990	432	147	579	36	11	47	468	158	626
1991	414	91	505	32	18	50	446	109	555
1992	390	92	482	75	6	81	465	98	563
1993	248	29	277	55	22	77	303	51	354
1994	239	130	369	63	22	85	302	152	454

Table 1. (cont.)

Year	<u>Tri-state Area Flocks</u>			<u>Restoration flocks</u>			<u>RMP/U.S. Breeding Segment</u>		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1995	307	55	362	58	7	65	365	62	427
1996	316	63	379	64	15	79	380	78	458
1997	310	54	364	48	15	63	358	69	427
1998	304	90	394	60	15	75	364	105	469
1999	312	56	368	35	14	49	347	70	417
2000	324	102	426	48	7	55	372	109	481
2001	362	59	421	54	12	66	416	71	487
2002	273	53	326	38 <sup>b</sup>	7 <sup>b</sup>	45 <sup>b</sup>	311 <sup>b</sup>	60 <sup>b</sup>	371 <sup>b</sup>
2003	291	95	386	30 <sup>b</sup>	1 <sup>b</sup>	31 <sup>b</sup>	321 <sup>b</sup>	96 <sup>b</sup>	417 <sup>b</sup>
2004	291	94	385	27 <sup>b</sup>	5 <sup>b</sup>	32 <sup>b</sup>	318 <sup>b</sup>	99 <sup>b</sup>	417 <sup>b</sup>
2005	355	98	453	49	8	57	404	106	510
2006	377	82	459	39 <sup>c</sup>	9 <sup>c</sup>	48 <sup>c</sup>	416 <sup>c</sup>	91 <sup>c</sup>	507 <sup>c</sup>
2007	383	115	498	28	1	29	411	116	527
2008	379	48	427	29	3	32	408	51	459
2009	361	75	436	35	2	37	396	77	473
2010	375	107	482	2 <sup>c, d</sup>	0	2 <sup>c, d</sup>	377	107	484
2011	354	89	443	37	0	37	391	89	480
2012	381	178	559	24	10	34	405	188	593
2013	455	110	565	44 <sup>e</sup>	1 <sup>e</sup>	45 <sup>e</sup>	499	111	610

<sup>a</sup> Blank denotes value not calculated because of incomplete survey.

<sup>b</sup> Data for only Malheur NWR and the Nevada flock included; Summer Lake WMA survey not completed.

<sup>c</sup> Count biased low; only a portion of Summer Lake WMA surveyed.

<sup>d</sup> Ruby Lake NWR did not provide data.

<sup>e</sup> Malheur NWR did not conduct survey.

Table 2. Counts of trumpeter swans of the Rocky Mountain Population U.S. Breeding Segment during fall, 1967-2013.

Year	<u>Montana</u>			<u>Idaho</u>			<u>Wyoming</u>			<u>Malheur NWR</u>			<u>Summer Lake WMA</u>			<u>Nevada</u>		
	White			White			White			White			White					
	birds	Cygnets	Total	birds	Cygnets	Total	birds	Cygnets	Total	birds	Cygnets	Total	birds	Cygnets	Total	birds	Cygnets	Total
1967	334	25	359	87	8	95	99	12	111	33	12	45	a			27	1	28
1968	242	123	365	88	6	94	101	25	126	34	11	45				24	9	33
1969	b									36	14	50				33	9	42
1970										37	13	50				8	3	11
1971	297	49	346	60	6	66	74	13	87	38	22	60				8	5	13
1972										32	13	45				10	3	13
1973										36	4	40				6	3	9
1974	296	49	345	71	17	88	90	14	104	29	9	38				6	0	6
1975										33	7	40				8	2	10
1976										23	8	31				8	1	9
1977	267	64	331	60	7	67	76	15	91	33	0	33				18	4	22
1978										24	13	37				15	2	17
1979	324	63	387							31	33	64				10	9	19
1980	315	6	321	73	11	84	74	6	80	53	15	68				18	11	29
1981										53	9	62				24	5	29
1982										38	17	55				18	3	21
1983	228	32	260	92	6	98	78	16	94	55	17	72				18	5	23
1984	268	22	290	80	21	101	83	15	98	40	6	46				25	3	28
1985	212	87	299	83	27	110	73	25	98	38	2	40				25	3	28
1986	174	28	202	83	14	97	74	19	93	19	24	43				15	2	17
1987	210	133	343	63	15	78	92	27	119	38	14	52				14	5	19
1988	268	77	345	87	28	115	109	32	141	33	8	41				16	1	17
1989	294	23	317	101	16	117	110	21	131	20	3	23				10	0	10
1990	245	108	353	92	28	120	95	11	106	27	7	34				9	4	13
1991	176	60	236	138	26	164	100	5	105	22	14	36	2	0	2	8	4	12
1992	156	74	230	109	8	117	125	10	135	28	6	34	34	0	34	13	0	13
1993	60	16	76	94	6	100	94	7	101	22	12	34	25	5	30	8	5	13

Table 2. (cont)

Year	<u>Montana</u>			<u>Idaho</u>			<u>Wyoming</u>			<u>Malheur NWR</u>			<u>Summer Lake WMA</u>			<u>Nevada</u>		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1994	70	48	118	79	49	128	90	33	123	15	7	22	33	6	39	15	9	24
1995	84	17	101	118	21	139	105	17	122	11	3	14	34	3	37	13	1	14
1996	95	36	131	127	20	147	94	7	101	17	5	22	32	5	37	15	5	20
1997	88	18	106	112	19	131	110	17	127	16	7	23	15	2	17	17	6	23
1998	105	35	140	110	37	147	89	18	107	22	5	27	17	3	20	21	7	28
1999	120	21	141	103	23	126	89	12	101	11	3	14	8	6	14	16	5	21
2000	127	24	151	102	40	142	95	38	133	10	5	15	12	0	12	26	2	28
2001	140	9	149	124	23	147	98	27	125	11	12	23	12	0	12	31	0	31
2002	76	18	94	103	14	117	94	21	115	14	7	21	2 <sup>c</sup>	0 <sup>c</sup>	2 <sup>c</sup>	24	0	24
2003	89	29	118	100	27	127	102	39	141	11	1	12	2 <sup>c</sup>	0 <sup>c</sup>	2 <sup>c</sup>	19	0	19
2004	89	32	121	112	23	135	90	39	129	10	5	15	b			17	0	17
2005	112	40	152	136	22	158	107	36	143	20	5	25	12	3	15	17	0	17
2006	117	17	134	132	39	171	128	26	154	17	5	22	6	0	6	16	4	20
2007	157	41	198	113	15	128	113	59	172	11	0	11	0	0	0	17	1	18
2008	140	7	147	112	5	117	127	36	163	9	3	12	0	0	0	20	0	20
2009	138	21	159	122	21	143	101	33	134	4 <sup>c</sup>	2 <sup>c</sup>	6 <sup>c</sup>	9	0	9	22	0	22
2010	129	30	159	101	29	130	145	48	193	2 <sup>c</sup>	0 <sup>c</sup>	2 <sup>c</sup>	11 <sup>a</sup>	0	11 <sup>a</sup>			
2011	123	40	163	98	12	110	133	37	170	5	0	5	17	0	17	15	0	15
2012	129	96	225	97	30	127	155	52	207	7	0	7	17	10	27	5	0	5
2013	208	26	234	80	28	108	167	52	219				24	1	25	20	0	20

<sup>a</sup>Swans translocated to Summer Lake WMA beginning in winter 1991; count from 1991 and 2010 not used in analyses.

<sup>b</sup>Blank denotes survey was not conducted.

<sup>c</sup>Incomplete count; data not used in analyses.

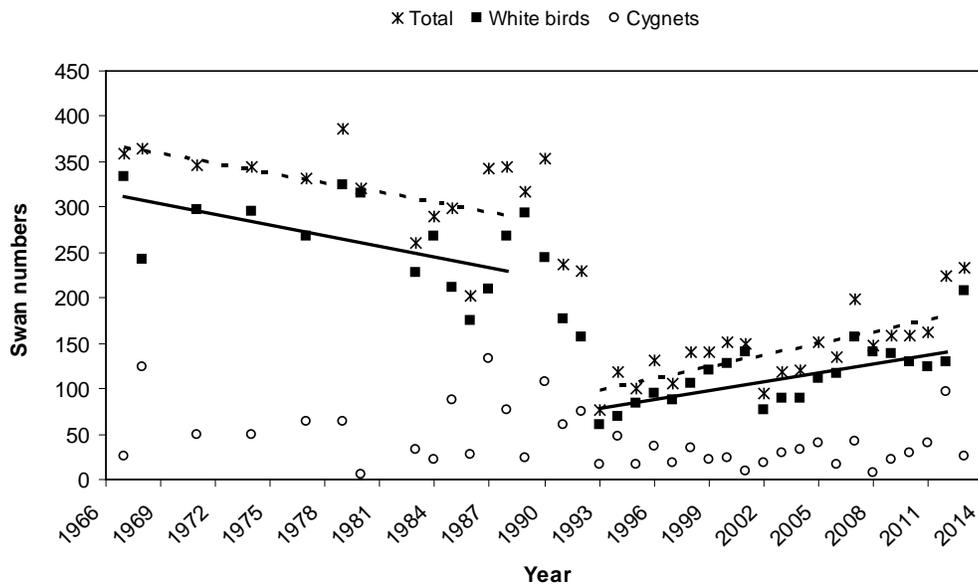


Fig. 7. Numbers of swans counted in Montana during the Fall Trumpeter Swan Survey, 1967-2013 (dotted and solid lines depict trends for total swans and white birds, respectively).

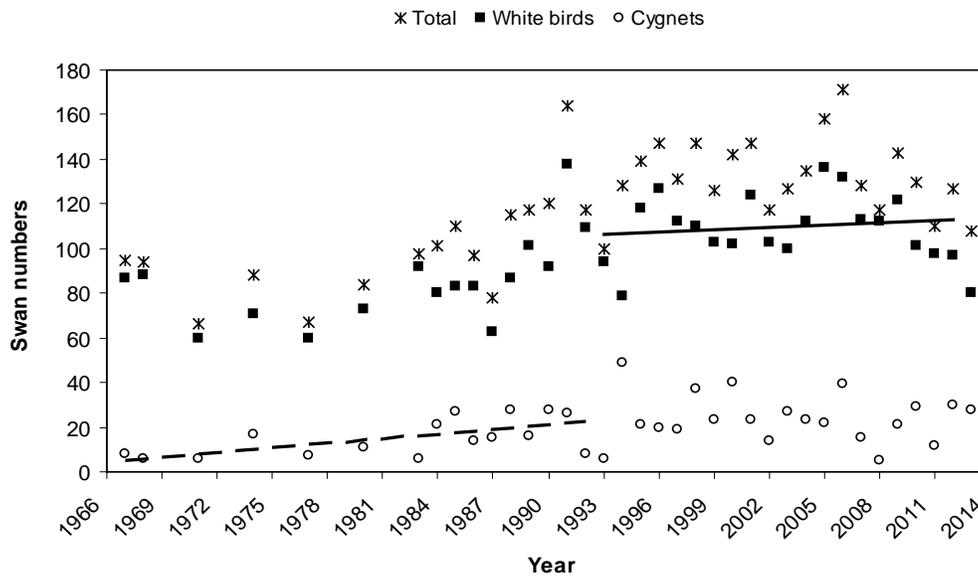


Fig. 8. Numbers of swans counted in Idaho during the Fall Trumpeter Swan Survey, 1967-2013 (solid and dashed lines depict trend for white birds and cygnets, respectively).

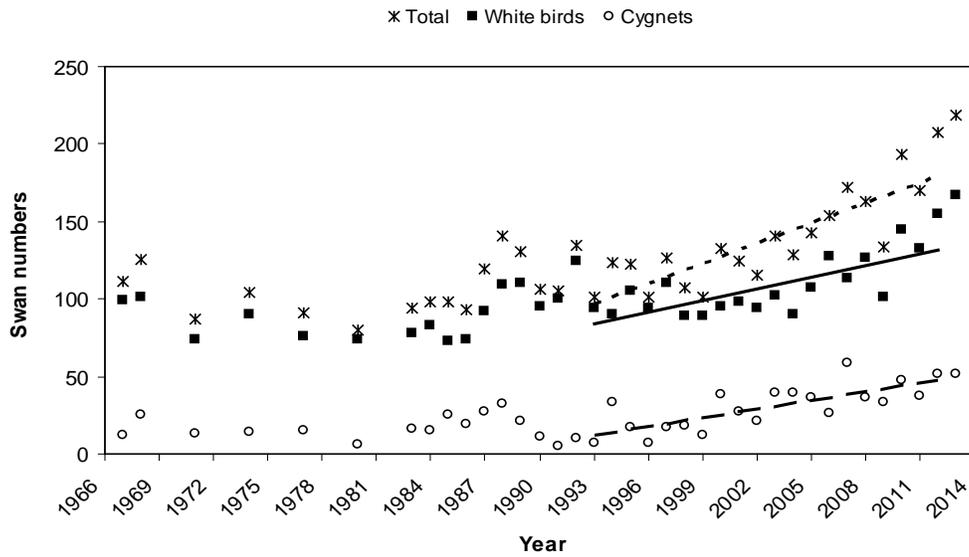


Fig. 9. Numbers of swans counted in Wyoming during the Fall Trumpeter Swan Survey, 1967-2013 (dotted, solid, and dashed lines depict trends for total swans, white birds, and cygnets, respectively).

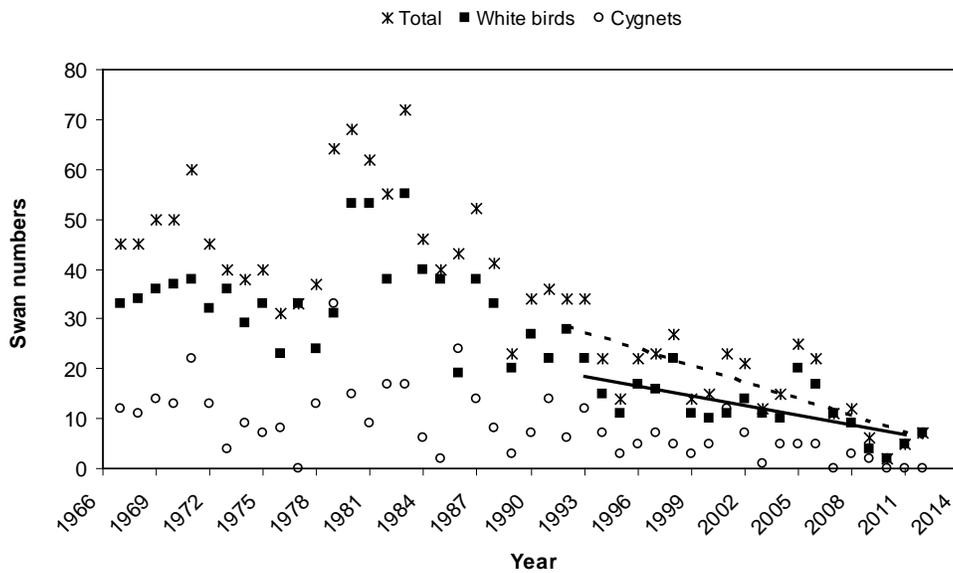


Fig. 10. Numbers of swans counted at Malheur NWR during the Fall Trumpeter Swan Survey, 1967-2013 (dotted and solid lines depict trends for total swans and white birds, respectively). No survey for 2013).

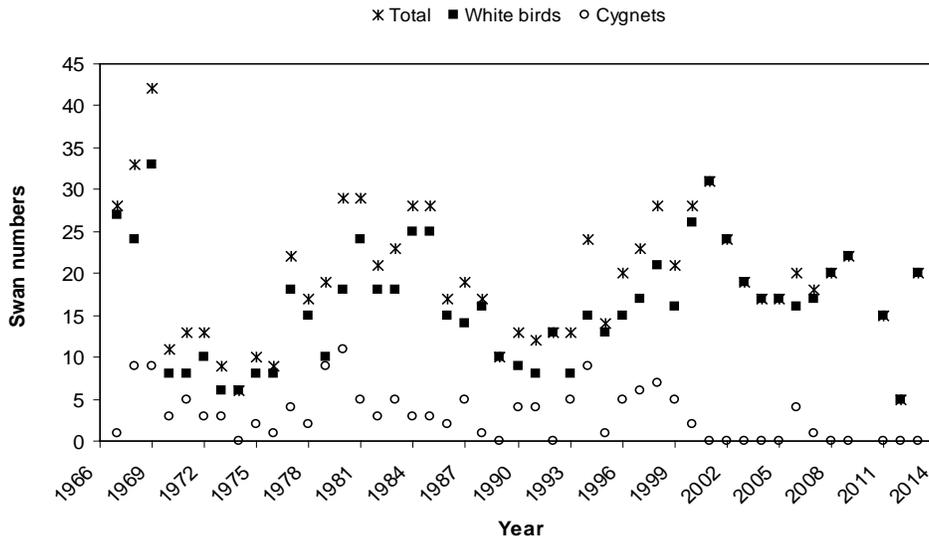


Fig. 11. Numbers of swans counted in the Nevada flock during the Fall Trumpeter Swan Survey, 1967-2013.

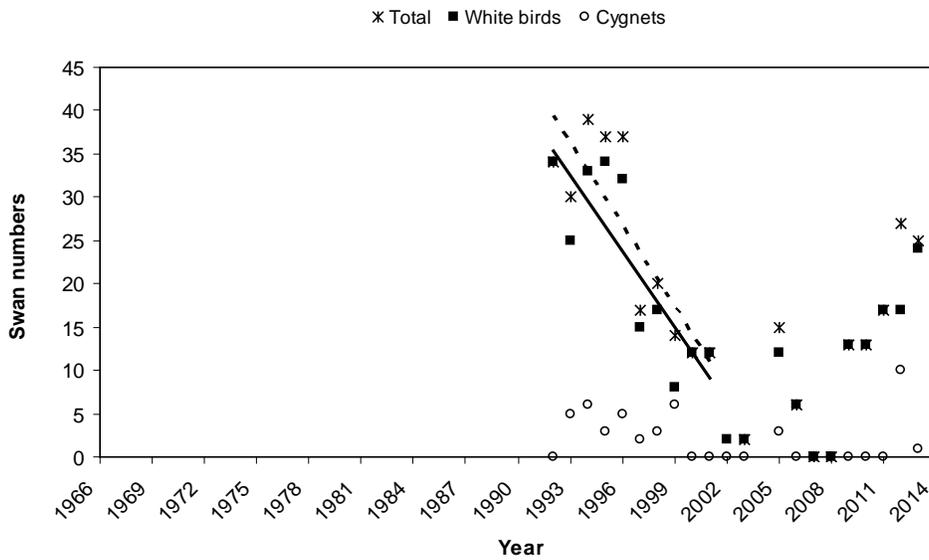


Fig. 12. Numbers of swans counted at Summer Lake WMA during the Fall Trumpeter Swan Survey, 1992-2013 (dotted and solid lines depict trends for total swans and white birds, respectively).

During 1988-92, several significant management actions affecting the RMP/U.S. Breeding Segment occurred concurrently (e.g., termination of winter feeding, experimental translocations of swans [U.S. Fish and Wildlife Service 2003]), and may collectively have influenced the demographics of these birds. The number of swans in the RMP/U.S. Breeding Segment (excluding counts for Summer Lake WMA) declined markedly (-51%) between the falls of 1988 and 1993, and the 1993 count was 44% below the 1967-88 average (Fig. 5). No marked changes in abundance were apparent for restoration flocks (Figs. 10, 11).

## Recent Trends

During 1993-2012, the growth rates for total swans and white birds in the RMP/U.S. Breeding Segment increased 1.6% and 1.5% annually, respectively ( $P \leq 0.01$ ) (Fig. 5). Cygnet growth rate was 2.2% annually, but the trend was not statistically significant ( $P = 0.11$ ). Similar results were evident for swans in the Tri-state Area Flocks during the same period, but the rates for total swans (+2.1,  $P < 0.01$ ) and white birds (+1.9,  $P < 0.01$ ) were slightly greater (Fig. 6). For the Tri-state Area Flocks, the trend for cygnets also was increasing and statistically significant (+3.4%,  $P = 0.03$ ).

The rate of growth for total swans in Montana increased 3.1% per year during the 1993-2012 period ( $P \leq 0.01$  Fig. 7), and the rate for white birds increased 3.2% per year ( $P \leq 0.001$ ); the data for cygnets suggested an increase of 3.6% but was not statistically significant ( $P = 0.36$ ). In Idaho, no trend ( $P = 0.92$ ) was evident for total swans. Similarly there was neither an increase nor decrease for white birds and cygnets ( $P = 0.52$  and  $P = 0.76$ , respectively) (Fig. 8). For Wyoming during 1993-2012, total swans (+3.0% per year,  $P < 0.001$ ), white birds (+2.1% per year,  $P < 0.001$ ), and cygnets (+7.6 % per year,  $P < 0.001$ ) increased (Fig. 9).

Because complete surveys of the Summer Lake WMA were not conducted during 2002-2004, we analyzed data for the Oregon flock by region (i.e., Malheur NWR, Summer Lake WMA). As mentioned above, the data for total birds and white birds at Malheur NWR suggested a piecewise regression with a breakpoint at 1983 would fit the data better than a simple linear regression. The decline of swans that occurred from 1984-91 (see above) continued during 1992-2012 for both total swans (-8.7% per year,  $P < 0.001$ ) and white birds (-7.4% per year,  $P < 0.001$ ) (Fig. 10). The rate for cygnets was unchanged ( $P = 0.11$ ). At Summer Lake WMA, swans were translocated to the area beginning in winter 1991, so data from fall 1992-2001 were analyzed. Regression analyses indicated large negative rates of growth for total birds (-15.7% per year,  $P = 0.03$ ) and white birds (-19.9% per year,  $P = 0.03$ ) (Fig. 12). No trend in the rate of cygnets produced was evident ( $P = 0.62$ ), but few cygnets ever have been produced at this location (0-6 per year,  $\bar{x} = 2.4$ ). However, most birds were translocated to Summer Lake WMA during winter, primarily to alleviate potential negative impacts of high swan concentrations on habitats in the Harriman State Park area of eastern Idaho. Most swans remained in the area for only a few months after being translocated (M. St. Louis, personal communication). Thus, the steep decrease in the number of swans at Summer Lake WMA does not reflect the decline of an established nesting flock, but rather suggests only that few of the >600 swans translocated to this area during the early 1990s (Shea and Drewien 1999) survived, or that most moved elsewhere

over time.

### **Core and Expansion Areas within the Tri-state Area**

The Pacific Flyway Management Plan for the RMP Trumpeter Swans has as a management objective to expand both the breeding and wintering range outside of the Core Tri-state area by implementing a management strategy to identify potential breeding and wintering expansion areas (Subcommittee on the Rocky Mountain Population of Trumpeter Swans 2008). The Core area was important in the early stages of trumpeter swan management due to the protection afforded to the swans by all the federal and state lands in that area. Those areas assisted in increasing the number of swans in the U.S. Breeding Segment of the Rocky Mountain Population. However, while the number of swans increased, the amount of habitat available to support them did not. Expansion areas were identified and used to assist in redistributing swans across the Greater Yellowstone Ecosystem.

In 2006, the Mountain-Prairie Region Migratory Bird Program of the U.S. Fish and Wildlife Service requested information from biologists that manage swans in the RMP to identify areas that have been surveyed since 1930's as either within or outside the Core Area. The Core Area refers to the entire Island Park region, Teton River Drainage, Teton Basin, Henrys and South Forks of the Snake River, and Camas NWR of Idaho; Red Rock Lakes NWR, Centennial Valley, Hebgen Lake, and Madison River and tributaries of Montana; and Yellowstone National Park, Grand Teton National Park and the Snake River drainage in Wyoming including the Jackson Hole area south to Alpine (Fig. 2) The Tri-state Expansion Area refers to portions of Montana, Idaho and Wyoming within the Pacific Flyway with suitable habitat for trumpeter swans, but outside of the Core Area. A list of these locations is provided in Table 3.

### **Results from 2013 Swan Counts from Core versus Expansion Areas**

Data (total swans counted) were taken from the Appendix in the Fall Reports from 1999 – 2013. Data were categorized as being from either the Core Area or the Expansion Area. Natural logarithms were calculated from the count data and were plotted over time for each state. Swans in Montana's Core ( $P = 0.01$ ) and Expansion ( $P = 0.01$ ) Areas have both increased over the last 14 years (3.5% and 6.0% respectively) (Fig. 13) and is the only state with a core area with a positive trend. Both Idaho ( $P = 0.14$ ) and Wyoming ( $P = 0.50$ ) core areas show no trend, but appear to be declining (-1.5 % and -0.5%, respectively) over the past 14 years (Figs. 14 and 15). However, swans in Wyoming's Expansion Area showed an increase of 10.6% ( $P < 0.01$ ), while those in Idaho's Expansion Area have shown no trend ( $P = 0.98$ ).

Table 3. Sites classified as either Core Area or Expansion Area for each state in the Rocky Mountain Population U.S. Breeding Segment, 1999 – 2013.

State	Core Area	Expansion Area
Montana	Red Rock Lakes NWR Centennial Valley Madison Valley	Paradise Valley
Idaho	Island Park Shotgun Valley Harriman State Park Upper Henry's Fork Lower Henry's Fork Camas NWR	Teton Basin Grays Lake NWR Soda Springs Area Bear Lake NWR Ft. Hall Bottoms Lower Snake River Minidoka NWR
Wyoming	Yellowstone National Park Upper Snake River/Targhee NF Bridger-Teton NF/Jackson Grand Teton National Park National Elk Refuge Jackson Area	Upper Green River New Fork River & Big Sandy Seedskadee NWR Lower Green River Green River Fontennelle Reservoir North Hamm's Fork Salt River

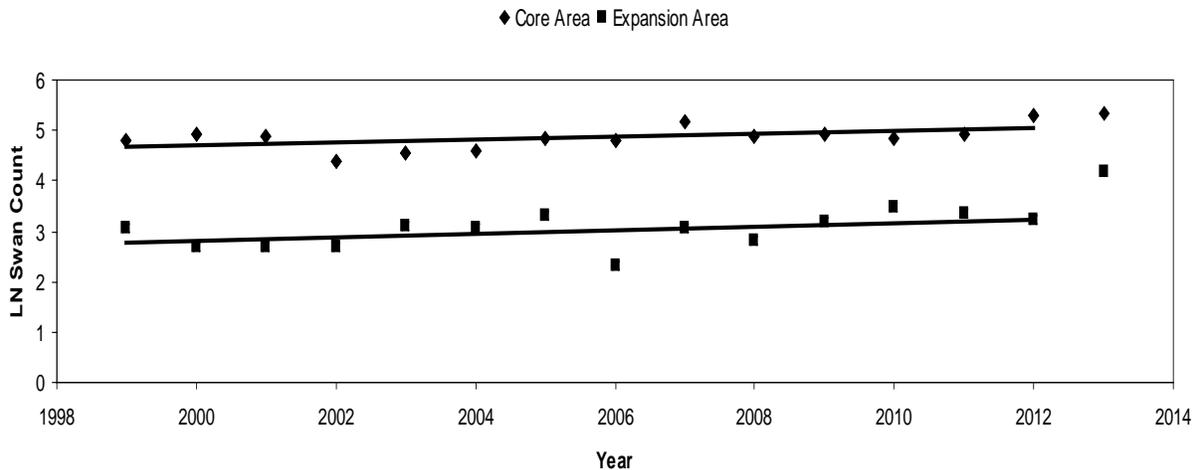


Figure 13. Growth rate of swans in Montana for both the Core and Expansion Area, 1999 - 2013.

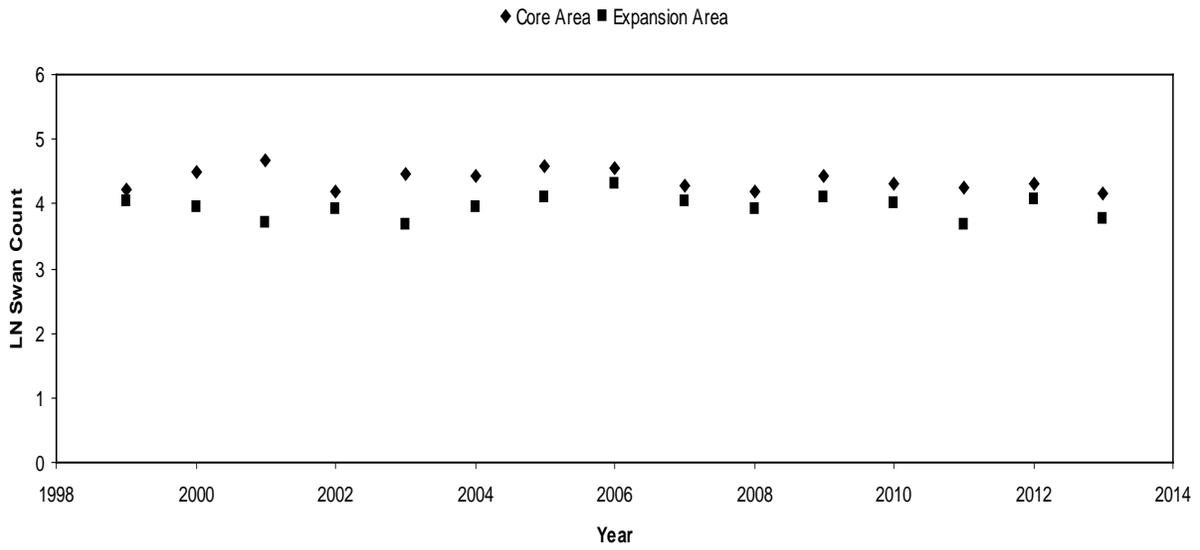


Figure 14. Growth rate of swans in Idaho for both the Core and Expansion Area, 1999 - 2013.

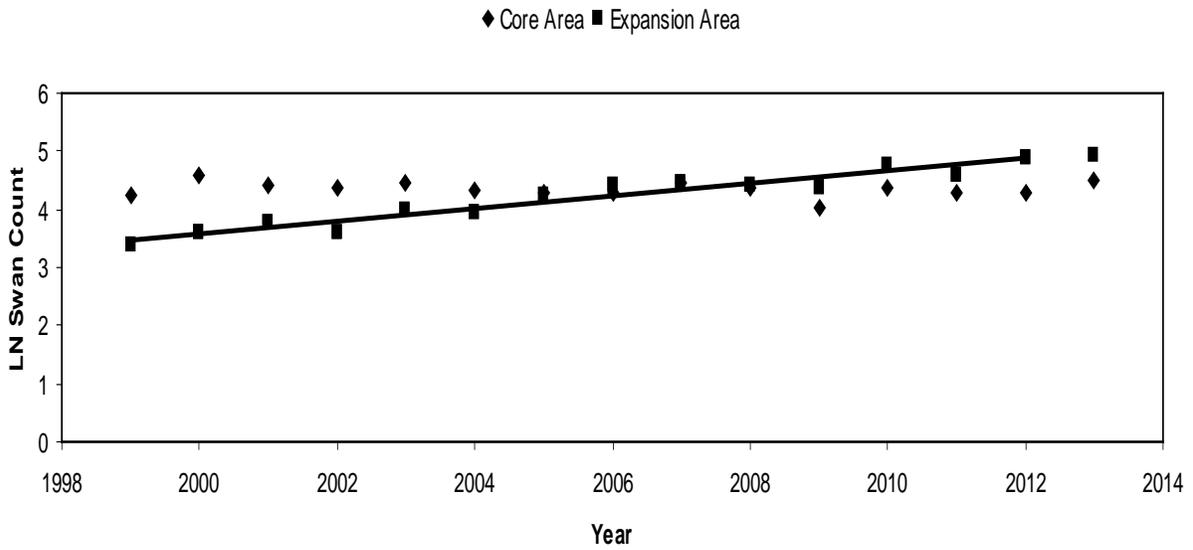


Figure 15. Growth rate of swans in Wyoming for both the Core and Expansion Area, 1999 - 2013.

## Results from the 2013 survey

During fall 2013, observers counted 610 total swans in the RMP/U.S. Breeding Segment, a 2.9% increase from the count last year (593) (Table 1, Fig. 5). The total count of swans in the Tri-state Area Flocks (565) was similar to last year's count (559) (Table 1) and the highest count since 1990. Idaho's total swan count (108) was a 15.0% decrease from last year (127). Montana (234) had its highest total count since 1991 (236), and increased by 4% from last year. The count of total swans in Wyoming (219) was the highest on record, and an increase of 5.8% from 2012. The number of white birds in the Tri-state region (455) increased from last year's count of 381, whereas the number of cygnets (110) decreased by 38.2% from last year's count of 178. The count of white birds increased in Montana and Wyoming but decreased in Idaho. Temperatures during spring were near average but spring precipitation was below average. Although production was down from last year, the number of white birds increased, which could have been from a high cygnet survival rate from last year's near record-breaking cygnet production.

Malheur NWR did not conduct a swan survey this year due to staff retiring and not being immediately replaced. Twenty-five swans were counted at Summer Lake Wildlife Management Area this year of which 1 was a cygnet. As part of the reintroduction program 1 additional yearling and 9 cygnets were relocated in 2013 to the flock at Summer Lake. Ruby Lake NWR conducted an aerial survey this year and counted 20 white birds and no cygnets. Ruby Lake has had no cygnet production in 10 of the last 12 years.

The cygnet counts decreased from 2012 by 72.9 % and 6.7% for Montana and Idaho, respectively. The large decrease in Montana production was due to the 140% increase between years 2011 and 2012. This year was closer to the long term average of 26.8 cygnets. Wyoming's count was the same as last year (52 cygnets). An index to production rate (i.e., cygnets/white birds) for Wyoming (0.311) was slightly higher for the sixth year in a row, and 32% higher than its long-term (i.e., 1967-2012) average (0.236). The index for Montana (0.125) was 54% lower than its long-term average (0.273), while Idaho's index (0.350) was 72% higher than its long-term average of 0.204.

## Montana Reintroduction Efforts

### *Confederated Salish Kootenai Tribes (CSKT):*

CSKT efforts in the reintroduction of Trumpeter Swans on the Flathead Indian Reservation (FIR) officially began with Tribal Council approval of a reintroduction proposal in 1996 (Becker and Lichtenberg 2007). Reintroduction wetland sites range from small depressions with little or no seasonal water present to large reservoirs dedicated primarily to irrigation. These sites are owned and managed by the CSKT, Montana Fish Wildlife and Parks (MFWP), USFWS, and private landowners. Initial efforts commenced in 1996 with the relocation of 19 swans from south central Oregon and again in 1998 when 10 cygnets were brought to the reservation from western Alberta. However, none of the swans returned to the FIR after their initial fall (?) migration. A re-evaluation of the entire project took place and the CSKT decided to use captive-reared swans from the Trumpeter Swan Fund (TSF) in Jackson, Wyoming due to their high

success rate of using captive-reared swans for reintroduction purposes. The goal is to have 8 nesting pairs on tribally owned land for at least 3 consecutive years.

*Results*

Since 2002 there have been a total of 239 captive releases on FIR (Table 4). The first nesting occurred in 2004. This year there were 17 nesting pairs. It marks the fourth consecutive year that there have been more than 8 nesting pairs.

*Blackfoot Valley*

In 2004, the U.S. Fish and Wildlife Service, Montana Fish Wildlife & Parks, and the University of Montana completed a trumpeter swan habitat suitability study of the Blackfoot Watershed and determined 29 sites were suitable for nesting territories, 9 wetlands of which were suitable for the release of trumpeter swans. An implementation plan was developed in 2005 with a goal of 7 breeding pairs that fledged young at least twice from nests in the Blackfoot. Reintroduction of trumpeter swans in the Blackfoot Valley of Montana began in 2005 with the release of 10 birds. All birds are marked with USGS aluminum leg bands and a red plastic leg band with white number/letter/number sequence (e.g., 3P1). All after hatch year birds are also fitted with red and white neck collars bearing codes that match the red plastic leg bands.

*Results*

Since 2005 there have been a total of 167 swans released in the Blackfoot Valley (Table 5). The first nesting occurred in 2011 with 2 nesting pairs producing a total of 6 cygnets. This year there were 4 nesting pairs producing 3 cygnets to fledging. Once implementation plan goals have been met, the swans will be included in Montana’s portion of this report.

Table 4. Confederated Salish Kootenai Tribes trumpeter swan reintroduction program at Flathead Indian Reservation 2002 – 2013.

<b>Year</b>	<b>Captive Releases</b>	<b>Adults</b>	<b>Cygnets</b>	<b>Total</b>	<b>Nests</b>
2002	34			34	
2003	34			34	
2004	0		7	7	3
2005	26		5	31	2
2006	20		8	28	2
2007	11	21	17	49	7
2008	12	26	19	57	6
2009	24	50	13	87	5
2010	30	29	20	79	9
2011	18	76	37	131	9
2012	18	106	20	144	13 <sup>a</sup>
2013	12	152	34	198	17 <sup>a</sup>

<sup>a</sup> Includes other areas in northwestern Montana

Table 5. Blackfoot Valley trumpeter swan reintroduction program 2005 – 2013.

<b>Year</b>	<b>Captive Releases</b>	<b>Adults</b>	<b>Cygnets</b>	<b>Total</b>	<b>Nests</b>
2005	10			10	
2006	17	2		19	
2007	13	6		19	
2008	43	4		47	
2009	29	12		41	
2010	30	18		48	
2011	10	12	6	28	2
2012	15	20	9	44	3
2013	10	21	3	34	4

## Conclusions

Changes in point counts of animals can be influenced by several factors (i.e., mortality, animal movements, survey problems). As a result, attributing annual changes in abundance to a specific factor or even a suite of factors is inherently difficult. The Fall Trumpeter Swan Survey provides a good index to abundance, because managers and biologists have strived over the years to maintain consistency in areas surveyed and personnel who conduct the survey. Nonetheless, issues inherent in monitoring migratory birds can potentially affect the accuracy of a count. Also, no systematic surveys to detect swan mortality are conducted, nor are operational programs (e.g., banding, neck collaring) in place to estimate annual survival. Therefore, unless monitoring of these birds is increased, or well-designed research is conducted to examine their demographics, isolating causes for changes in annual counts will remain elusive.

The number of swans in the entire RMP/U.S. Breeding Segment increased from 2012 to the highest levels since 1990, as did the count for the Tri-state Area Flocks and a record number of cygnets were counted. Palmer Drought Indices suggest that June 2013 moisture conditions within the range of the RMP/U.S. Breeding Segment were below average and approached severe drought conditions. This could have produced the average nesting conditions, which was a decline from last year's near record nesting season for RMP trumpeter swans. The number of birds that were recorded during this fall's survey remains below objectives stated in the management plan for this group of birds (Subcommittee on the Rocky Mountain Population of Trumpeter Swans 2008).

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Appendix A. Site-specific counts of trumpeter swans of the Rocky Mountain Population/U.S. Breeding Segment during the Fall Trumpeter Swan Survey, 2013.

<b>Montana</b>	White birds	Cygnets	Total	Pilot/observer/notes
<i>Red Rock Lakes NWR</i>				P: D. Chapman O: Bill West, 9/12/13
Upper Red Rock Lake	32	2	34	
Upper Lake Outlet to River Marsh	7	0	7	
Swan Lake	0	0	0	
Shambo Pond	2	0	2	
River Marsh	16	1	17	
Lower Red Rock Lake	14	6	20	
West Pintail Ditch	0	0	0	
Widgeon Pond	2	0	2	
Sparrow Slough	0	0	0	
Sparrow Pond	0	0	0	
Shoveler Pond	0	0	0	
Culver Pond	4	0	4	
MacDonald Pond	0	0	0	
ElkSprings Creek	0	0	0	
Tucks Slough	8	0	8	
Red Rock Creek	0	0	0	
Antelope Pond	0	0	0	
Sora Pond	0	0	0	
<b>Subtotal</b>	<b>85</b>	<b>9</b>	<b>94</b>	
<i>Centennial Valley (CV)</i>				
Red Rock River	17	0	17	
Lima Reservoir	2	1	3	
Blake Slough	65	0	65	
Elk Lake	2	0	2	
7L Wetland	2	1	3	
Mud Lake	0	0	0	
Sheepherder Pond	0	0	0	
Huntsman Pond	0	0	0	
Scheid Stock Pond	0	0	0	
Jones Pond	2	0	2	
Winslow Pond	0	0	0	
Winslow Creek	0	0	0	
Bean Creek Pond (tooth pond)	0	0	0	
Pond, T16 R39 S28 "Peet Creek"	0	0	0	
Sand Creek Wetland	0	0	0	
<b>Subtotal</b>	<b>90</b>	<b>2</b>	<b>92</b>	
<i>Madison Valley</i>				
Ennis Lake	0	0	0	
Walsh Ponds	0	0	0	
Madison River	0	0	0	
Hidden Lake	0	0	0	
Otter & Goose Lake	0	0	0	
Cliff Lake	0	0	0	

Wade Lake	0	0	0	
Conklin Lake	2	6	8	
Tributary to Odell Creek	13	0	13	
Quake Lake	0	0	0	
Hebgen Lake (Madison Arm)	0	0	0	P: R. Stradley, O: D. Smith (9/16)
Denny Creek (just south of Hebgen)	0	0	0	
<b>Subtotal</b>	<b>15</b>	<b>6</b>	<b>21</b>	
<i>Paradise Valley</i>				P: R. Stradley, O: D. Smith (9/16)
Sacagawea Park	2	2	4	
DePuy's-South	2	0	2	
Beaver Creek	0	0	0	
DePuy's-Main Lake	0	0	0	
DePuy's-North	0	0	0	
Armstrong's	5	5	10	
Bailey's	0	0	0	
Brandis'	0	0	0	
Brandis' North Fish Ponds Slough	0	0	0	
Diamond B	0	0	0	
Dana's	0	0	0	
Deep Creek	0	0	0	
Unknown Location	0	0	0	
Nelson's	3	0	3	
Paradise Valley Airport	0	0	0	
Emigrant Meadows	0	0	0	
Yellowstone River (south of Emigrant)	0	0	0	
Emigrant Ditch	2	0	2	
Emigrant Creek	2	0	2	
Emigrant Pond	2	2	4	
<b>Subtotal</b>	<b>18</b>	<b>9</b>	<b>27</b>	
<b>Montana Total</b>	<b>208</b>	<b>26</b>	<b>234</b>	
<b>Idaho</b>				
				P: P Thorpe; O: D. Collins, P. Donnelly (9/9-9/12)
<i>Island Park/Upper Henry's Fork</i>				
Henry's Lake	0	0	0	
Henry's Lake Flat	0	0	0	
Big Springs to Mack's Inn	0	0	0	
Henry's Fork	0	0	0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Shotgun Valley</i>				
South Shore Island Park Reservoir	0	0	0	
Sheep Creek Reservoir	0	0	0	
Icehouse Reservoir	1	0	1	
Shotgun Reservoir	0	0	0	dry
North shoreline Island Park Reservoir	0	0	0	
Sheridan Reservoir	11	0	11	
Sheridan Creek (cabin with pond)	0	0	0	
Twin ponds on Icehouse creek	0	0	0	
<b>Subtotal</b>	<b>12</b>	<b>0</b>	<b>12</b>	

<i>Harriman State Park</i>				
Henry's Fork above Osbourne Bridge	4	0	4	
Henry's Fork below Osbourne Bridge	0	0	0	
Silver Lake	4	7	11	2ad/4cyg; 2ad/3cyg
Golden Lake	0	0	0	
Pond east-northeast of Golden Lake	0	0	0	
Thurman Creek	0	0	0	
Fish Pond	2	4	6	
<b>Subtotal</b>	<b>10</b>	<b>11</b>	<b>21</b>	
<i>Upper Henry's Fork Area</i>				
Buffalo River	0	0	0	
Henry's Fork-Box Canyon to Harriman State Park	0	0	0	
Trude Siding-Pond/Elk Creek complex	0	0	0	
Tom's Creek	0	0	0	
Blue Spring	0	0	0	dry
Last Chance Pond-north	0	0	0	
Last Chance Pond-south	0	0	0	
Henry's Fork below Pine Haven	0	0	0	
Boy Scout (Boundary) Pond	0	0	0	
Boy Scout swimming lake	0	0	0	
Eccles Butte Northeast	0	0	0	Dry
Eccles wetland #1	0	0	0	Almost dry
Eccles wetland #2	0	0	0	
Eccles wetland #4	0	0	0	
Eccles wetland #5	0	0	0	Dry
Swan Lake (west)	0	0	0	
Hatchery Butte Road ponds	0	0	0	Dry
Lilypad Lake (Pineview)	0	0	0	Split into 2 ponds; drying
Hatchery Butte	0	0	0	
North of Hatchery Butte	0	0	0	
Beaver Pond (Gerrit)	0	0	0	
Railroad Pond	0	0	0	Dry
Pond northeast of Gerrit	0	0	0	Dry
Mesa Marsh	2	2	4	
Northwest of Mesa Marsh	0	0	0	
Bear Lake and Cub Lake	0	0	0	Dry
Twin Lakes	0	0	0	
Porcupine Lake	0	0	0	
Beaver Lake	0	0	0	Dry
Rock Creek and adjacent pond	2	0	2	
Lower Goose Lake	0	0	0	
Upper Goose Lake	0	0	0	
Long Meadows	0	0	0	Mostly Dry
Swan Lake (east-Falls River)	0	0	0	
Steele Lake	0	0	0	
Putney Meadows	0	0	0	Dry
Falls River Ridge complex-4 ponds	0	0	0	
Thompson's Hole	0	0	0	
Pond west of Thompson's Hole	0	0	0	
Chain Lakes	0	0	0	

Fall River Canyon	0	0	0	
Horseshoe Lake	0	0	0	
Tule Lake and adjacent ponds	0	0	0	
<b>Subtotal</b>	<b>4</b>	<b>2</b>	<b>6</b>	
<i>Teton Basin</i>				
McReynolds Reservoir	0	0	0	
Teton Basin	1	0	0	put there for cygnet relocation
<b>Subtotal</b>	<b>1</b>	<b>0</b>	<b>0</b>	
<i>Lower Henry's Fork</i>				
Upper Arcadia Reservoir	2	0	2	
Lower Arcadia Reservoir	0	0	0	
Marsh northwest of Upper Arcadia Reservoir	0	0	0	
Mikesell Reservoir 1	4	0	4	
Mikesell Reservoir 2	0	0	0	
Sand Creek Wildlife Management Area and springs	2	0	2	
Sand Creek below Wildlife Management Area	0	0	0	
Wetlands west of Ashton	0	0	0	
Willow Creek ponds	0	0	0	
Chester Reservoir	0	0	0	
West of Chester Dam	0	0	0	
Singleton Ponds	0	0	0	
Lemon Lake	0	0	0	
Mackerts Pond	2	0	2	
Pond +/- 1 mile north of St. Anthony	0	0	0	
Deer Park Wildlife Management Area	0	0	0	
Cartier Slough Wildlife Management Area	0	0	0	
Davis Lake	2	0	2	
Egin Lakes	0	0	0	
Quayle's Lake	0	0	0	
Henry's Fork above Menan Butte	0	0	0	
Lower Henry's Fork to east of Market Lake	0	0	0	
Snake River	0	0	0	
<b>Subtotal</b>	<b>12</b>	<b>0</b>	<b>12</b>	
<i>Camas NWR</i>				
Toomey Pond	0	0	0	dry
2-Way Pond	0	0	0	
Rays Lake	0	0	0	dry
Center Pond	1	0	1	
Big Pond	2	4	6	
First pond north of Sandhole Lake	0	0	0	
Sandhole Lake	2	0	2	
Mallard Slough	0	0	0	dry
Redhead Pond	2	3	5	
Camas Creek	0	0	0	
Mud Lake Wildlife Management Area	0	0	0	
Market Lake Wildlife Management Area	0	0	0	
Pond southeast of Market Lake	0	0	0	
Spring Pond	0	0	0	

<b>Subtotal</b>	<b>7</b>	<b>7</b>	<b>14</b>	
<i>Grays Lake NWR</i>				
Shorty's Cabin	0	0	0	
Buck Lake (west of Bear Island)	0	0	0	
Big Springs Area	0	0	0	
Bishop Island	0	0	0	
B Riley Point (northwest of Bear Island)	2	0	2	
Outlet (main)	3	3	6	2ad/3cyg; 1 ad;
Big Bend Marsh	4	1	5	2ad/1cyg; 2ad
Brockman Creek	2	0	2	
Outlet Creek (north of road)	0	0	0	
North Canal	0	0	0	
South Canal	2	0	2	
Lakefront ponds (west of Headquarters)	2	0	2	
Kackley/Gravel Creek	0	0	0	
Beavertail	6	0	6	
Crane Reservoir (Little Valley)	5	0	5	
Chubb Springs	0	0	0	
Reservoir south of Wayan	0	0	0	
Crane Creek	0	0	0	
<b>Subtotal</b>	<b>26</b>	<b>4</b>	<b>30</b>	
<i>Soda Springs Area</i>				
5-Mile Meadow	0	0	0	
Miller Pond	0	0	0	
Soda Creek - Miller > Cellan Reservoir	0	0	0	
Cellan Reservoir	0	0	0	
Soda Creek-spring creek west of Soda Springs	0	0	0	
Chester Basin	0	0	0	
Alexander Reservoir	0	0	0	
Alexander Siding	0	0	0	
Woodall Springs	0	0	0	
Blackfoot Reservoir	0	0	0	
Chesterfield Reservoir	0	0	0	
Chicken Creek wetlands	0	0	0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Bear Lake NWR</i>				
Rainbow Unit	0	0	0	
Rainbow Subunit	0	0	0	
Alder Unit	0	0	0	
Mud Lake Unit	2	0	2	
Salt Meadow Unit	2	0	2	
Dingle Unit	0	0	0	
West Canal Unit	2	0	2	
Thomas Fork Unit	2	4	6	
Bloomington Unit	0	0	0	
<b>Subtotal</b>	<b>8</b>	<b>4</b>	<b>12</b>	
<i>Fort Hall Bottoms</i>				

Head of Clear Creek	0	0	0	
American Falls Reservoir-northwest corner	0	0	0	
Kinney Creek	0	0	0	
Clear Creek above Sheepskin Road	0	0	0	
Cabin Creek	0	0	0	
Mouth of Portneuf River	0	0	0	
Flying Y	0	0	0	
Fisher Creek	0	0	0	
Sloughs along Broncho Road	0	0	0	
Diggie Creek	0	0	0	
Big Jimmy Creek	0	0	0	
Springfield Reservoir	0	0	0	
Sterling Wildlife Management Area	0	0	0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Lower Snake River</i>				
American Falls Reservoir - Minidoka NWR	0	0	0	
C. J. Strike Reservoir	0	0	0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Minidoka NWR</i>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Other Idaho</i>				
Pond near Bear River southwest of Grace	0	0	0	
Chesterfield Reservoir	0	0	0	
Wetland on Toponce Creek	0	0	0	
Wetlands east of Blackfoot	0	0	0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Central and Western Idaho</i>				
White Arrow Ponds (Bliss)	0	0	0	checked by IDF&G
Fairfield Gravel Pit	0	0	0	checked by IDF&G
Clear Springs Pond	0	0	0	
Mormon Reservoir	0	0	0	
Silver Creek (Picabo)	0	0	0	checked by IDF&G
Kanaka Rapids	0	0	0	
Owsley Bridge - Upper Salmon Falls Dam	0	0	0	
Oxford Slough Waterfowl Production Area	0	0	0	
Swan Lake (Bannock County)	0	0	0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Idaho Total</b>	<b>81</b>	<b>28</b>	<b>109</b>	Note 1 adult not used in analysis 80; 28; 108
<b>Wyoming</b>				
<i>Yellowstone National Park</i>				P:Steve Ard; O:D. Smith 9/16/13
Geode Lake	0	0	0	
Crescent Pond	0	0	0	
Slough Creek	0	0	0	
Tern Lake	0	3	3	Released 9/13/13; not used in analysis
Yellowstone Lake west-northwest of Molly Island	0	0	0	
Yellowstone Lake south arm	3	0	3	
Yellowstone Lake - Yellowstone River delta (se arm)	3	0	3	

Beach Springs	0	0	0	
Heart Lake	0	0	0	
Yellowstone River, Alum-Grizzly Overlook	4	4	8	4 cyg released 9/11/13
Yellowstone River, north of Fishing Bridge	0	0	0	
Yellowstone River, Hayden Valley	0	0	0	
Boundary Creek	0	0	0	
Boundary Creek Pond	0	0	0	
Buela Meadow (Lake)	0	0	0	
Lillypad Lake	0	0	0	
Junco Lake	0	0	0	
Riddle Lake	0	0	0	
Falls River	0	0	0	
Upper Boundary Lake	0	0	0	
7-Mile Bridge	0	0	0	
Swan Lake	0	0	0	
Robinson Lake	0	0	0	Lake appeared dry
Richardson's Pond	1	0	1	
West Robinson Lake	0	0	0	
Bechler Meadow	1	0	1	
Lower Madison River	0	0	0	
Nymph Lake	0	0	0	
Grizzly Lake	0	0	0	
Obsidian Lake	0	0	0	
Floating Island Lake	0	0	0	
Trumpeter Lake	0	0	0	
North Kidney Lake	0	0	0	
Grebe Lake	0	0	6	
Yellowstone Delta	0	0	0	
Winnegar Lake	0	0	0	
South Arm - Grouse	0	0	0	
East end of Mary Bay	0	0	0	
Delusion Pond	5	0	5	3 were yearlings released in June
Northwest of Winegar Lake	0	0	0	
Fern Lake	0	0	0	
Cascade Lake	0	0	0	
Pelican Creek (mouth)	0	0	0	
Goose Lake	0	0	0	
Tanager Lake	0	0	0	
<b>Subtotal</b>	<b>17</b>	<b>7</b>	<b>24</b>	
<i>Upper Snake River/Targhee National Forest</i>				P: D. Stinson; O: S. Patla (9/11, 9/16)
Ernest Lake	0	0	0	
Bergman Reservoir	0	0	0	Small pool of water
Indian Lake	2	0	2	
Squirrel Meadows	0	0	0	
Boone Creek	0	0	0	
Winegar Creek (new 2009)	2	0	2	Lost 2 cygnets
Widget Lake	0	0	0	
Junco Lake	0	0	0	
Moose Lake	0	0	0	
Loon Lake	0	0	0	
Rock Lake	0	0	0	

Fish Lake	0	0	0	
Grassy Lake Reservoir	0	0	0	
<b>Subtotal</b>	<b>4</b>	<b>0</b>	<b>4</b>	
<i>Bridger-Teton National Forest-Jackson</i>				
Arizona Lake	0	0	0	
Blackrock Ranger Station pond/sloughs	0	0	0	
Enos Lake	1	0	1	
Bridger Lake	0	0	0	
Atlantic Creek	2	2	4	
Lily Lake	0	0	0	
Pinto Pond	2	4	6	
Half Moon Lake	2	0	2	
Tracy Lake	0	0	0	
Hatchet Pond	0	0	0	
Burnt Fork Potholes	0	0	0	
Buffalo F river	4	0	4	2 pairs
Upper Slide Lake	2	0	2	
Goose Lake	0	0	0	
Lower Slide Lake	0	0	0	
Soda Lake	nc	nc	0	no reports of swans this year
Bradley Lake (Snake River Canyon)	0	0	0	
<b>Subtotal</b>	<b>13</b>	<b>6</b>	<b>19</b>	
<i>Grand Teton National Park</i>				
Polecat Slough	0	0	0	
Flagg Ranch gravel pits	0	0	0	
Elk Ranch Reservoir	2	0	2	
Hedrick Pond	0	0	0	Low water
Swan Lake	3	0	3	One on slough; pair on lake
Christian Pond	0	0	0	Very low water
Glade Creek north	0	0	0	
Glade Creek south (north of Tusker's Island)	0	0	0	
Glade Creek cliff slough	2	2	4	
Steamboat Mountain	2	1	3	Lost one young
Jackson Lake north	0	0	0	
Jackson Lake south	4	0	4	Two pairs
Two Ocean Lake	1	0	1	
Emma Matilda Lake	0	0	0	
Dam to Moran, Snake River	0	0	0	
Moran to Moose, Snake River	0	0	0	Did not fly river corridor; winter use only
<b>Subtotal</b>	<b>14</b>	<b>3</b>	<b>17</b>	
<i>National Elk Refuge</i>				
Visitor Center ponds	0	0	0	
Main Marsh Central	0	0	0	
Northwest Main Marsh (near overlook)	2	0	2	
Southeast Main Marsh	2	0	2	
Northeast Main Marsh	2	2	4	
Miller/Winnegar Springs	2	2	4	

Shop pond	0	0	0	
Pierre Pond east	0	0	0	
Pierre Pond west	0	0	0	
Romney Pond #2	1	0	1	
Nowlin Ponds	0	0	0	
Flat Creek north	0	0	0	
<b>Subtotal</b>	<b>9</b>	<b>4</b>	<b>13</b>	
<i>Jackson Area</i>				
Tucker Pits				
Skyline Pond (Puzzleface Ranch)	2	0	2	New pond north end
Boyles Hill area				
Highway 89 winter pen				
3 Creeks Golf Course Development (2013)	3	0	3	yearlings
South Park Loop Area	3	0	3	Small private pond
South Park Unit, Wyoming Game & Fish Dept.	2	3	5	Lost one young
Treatment Plant ponds	0	0	0	
Hillwood Pond, Bar BC (added 2010)				
<b>Subtotal</b>	<b>10</b>	<b>3</b>	<b>13</b>	
<i>Upper Green River (north of Warren Bridge)</i>				
Potholes north of Mosquito Lake	0	0	0	
Mosquito Lake	2	0	2	
Wagon Creek Lake	0	0	0	
Rock Crib Lake	0	0	0	
Mud Lake	2	0	2	
Roaring Fork Pond	0	0	0	
Dollar Lakes	0	0	0	
Upper Green River above Big Bend	0	0	0	
Circle S/Jensen Pond (added 2010)	2	0	2	On main river channel
Carney Slough	2	0	2	On main river channel
Carney Fish Pond	0	0	0	
Green River Big Bend to Black Butte	0	0	0	
O Bar Y Ranch Pond	2	3	5	New nest site 2012
Green River Black Butte to Warren Bridge	0	0	0	
Spade Slough	0	0	0	
New Fork Potholes/Marsh Creek	0	0	0	Low water
Kendal Wetland	2	0	2	
Blatt Ranch Reservoir; willow creek	2	0	2	
New Fork River (north of highway 191)	0	0	0	
Kitchen Reservoir north	2	0	2	Pair on most northern reservoir
Kitchen Ranch Reservoir main	2	0	2	
Soda Lake area	0	0	0	
Fayette Ranch ponds	0	0	0	
Forty Rod Headwater Slough	2	0	2	
Pape Ranch pond (added 2010)	2	1	3	
Webb Draw, Horse Creek (added 2010)	2	2	4	First year for cygnets
Fenn Duck Cr pond (added 2012)	2	0	2	Pair molted here
<b>Subtotal</b>	<b>26</b>	<b>6</b>	<b>32</b>	

<i>New Fork River &amp; Big Sandy to Farson area</i>				
New Fork River Pinedale to Boulder	0	0	0	
Fayette Ranch New Fork ponds	2	2	4	
Boulder Sloughs	0	0	0	
Sloughs south of Boulder to East Park	0	0	0	
Swift Reservoir	1	3	4	Mate lost during incubation
Jensen slough, Anticline (added 2010)	2	0	2	
New Fork to confluence with Green	2	0	2	Slough west of Jensen's
East Fork until it narrows	0	0	0	
East Fork Gun Club Ponds (added 2010)	2	3	5	
Big Sandy/Big Bend	0	0	0	FWS Crane Survey
Big Sandy/Eden reservoirs	0	0	0	
Farson area	0	0	0	
<b>Subtotal</b>	<b>9</b>	<b>8</b>	<b>17</b>	
<i>Seedskaadee NWR (SNWR) and lower Green River</i>				
Green River, north of refuge HQ	2	0	2	
Main Marsh Hawley, Pool 1, SNWR	2	0	2	
Main Marsh Hawley, Pool 2, SNWR	2	3	5	2 pairs nested in same pool again
Main Marsh Hawley, Pool 3, SNWR	2	4	6	
Main Marsh Hawley, Pool 4, SNWR	2	2	4	
Main Marsh Hawley, Pool 5, SNWR	0	0	0	
Main Marsh Hawley Unit, Pool 6, SNWR	0	0	0	
Main Marsh Hawley, Pool 7, SNWR	0	0	0	
Main Marsh Hawley, channel, SNWR	0	0	0	
Headquarters Marsh, SNWR	0	0	0	
Hamp Unit, SNWR	2	2	4	One white cygnet
Sagebrush Wetland, SNWR	2	5	7	Two white, 3 gray cygnets
Dunkle Wetland, SNWR	2	0	2	
Green River Dunkle to Big Island	1	0	1	
Green River Telephone Island	4	0	4	
Green River south of Highway 28, SNWR	0	0	0	
Green River Highway 28 to dam, SNWR	1	0	1	
Killdeer Wetlands, Green River city	2	0	2	
OMC plant area (added 2012)	0	0	0	
Green river Mann's Flat Area	2	0	2	
Hofeldt Ranch pond (added 2012)	7	0	7	
<b>Subtotal</b>	<b>33</b>	<b>16</b>	<b>49</b>	
<i>Green River Fontenelle Reservoir north to Daniel</i>				
Fontenelle Reservoir	14	0	14	
Big Piney cutoff, Green River	0	0	0	
Green river North of HWY 351	3	0	3	
Muddy Creek Slough N of Big Piney (added 2012)	0	0	0	
Dry Piney Creek area, Green River	2	0	2	
La Barge pond (private)	0	0	0	
Green River Long Island Area	6	0	6	
Ferry Island Slough	2	2	4	
Sommers Ranch, pond west of River	2	0	2	
Soapholes, Cottonwood Creek (added 2010)	2	0	2	BLM, Rimfire Ranch pond - 2 pairs
Soapholes, BLM ponds (added 2013)	2	4	6	

<b>Subtotal</b>	<b>33</b>	<b>6</b>	<b>39</b>	
<i>Hamm's Fork</i>				
McNaughton Reservoir, Hamm's Fork			0	NOT FLOWN
Hamm's Fork north of Kemmerer			0	
<b>Subtotal</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<i>Salt River</i>				
Palisades Reservoir, Alpine wetland	2	0	2	
Swan Cove SD Marsh	0	0	0	
Salt River, Alpine to Freedom	0	0	0	
Salt River, Freedom to Afton	0	0	0	
<b>Subtotal</b>	<b>2</b>	<b>0</b>	<b>2</b>	
<i>Other Wyoming</i>				
Martins Pond, BLM, Wind River	2	5	7	
Alkalai Lake, Wind River Reservation	1	5	6	
<b>Subtotal</b>	<b>3</b>	<b>10</b>	<b>13</b>	
<b>TOTAL WY outside YNP</b>	<b>153</b>	<b>52</b>	<b>205</b>	
<b>TOTAL WY including YNP</b>	<b>167</b>	<b>52</b>	<b>219</b>	Total doesn't YNP releases for 2013
<b>Nevada</b>				
Ruby Lake NWR	20	0	20	N. Sake, G. Wagner
Franklin Lake	0	0	0	Dry
<b>Oregon</b>				
Malheur NWR				
Summer Lake Wildlife Management Area	18	11	29	M. St. Louis: 9/4/2013, 1 white and 11 grays were translocated this year
Rabbit Valley Reservoir	3	0	3	
Sycan Marsh	0	0	0	
Thompson Reservoir	2	0	2	
Crooked River wetlands, Crook County, OR	2	0	2	

<sup>a</sup>Blank denotes area not surveyed.

Appendix B. Personnel who conducted the 2013 Fall Trumpeter Swan Survey in the U.S.

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

Observer: B. West (Red Rock Lakes NWR)  
Pilot: D. Chapman (Montana Aircraft, Inc.)

Montana (Paradise Valley)

Observer: D. Smith (Yellowstone National Park)  
Pilot: S. Ard (Yellowstone National Park)

Idaho

Observer: D. Collins (FWS), P. Donnelly (FWS, IWJV),  
P. Anderson (Southeast Idaho NWR Complex)  
Pilot: P. Thorpe (U.S. Fish and Wildlife Service)

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: S. Ard (Yellowstone National Park)

Ruby Lake NWR and vicinity

Observer: G. Wagner (Ruby Lake NWR)  
Pilot: N. Sake

Malheur NWR

No Survey this year

Summer Lake WMA

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

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