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James A. Dubovsky

Migratory Birds and State Programs

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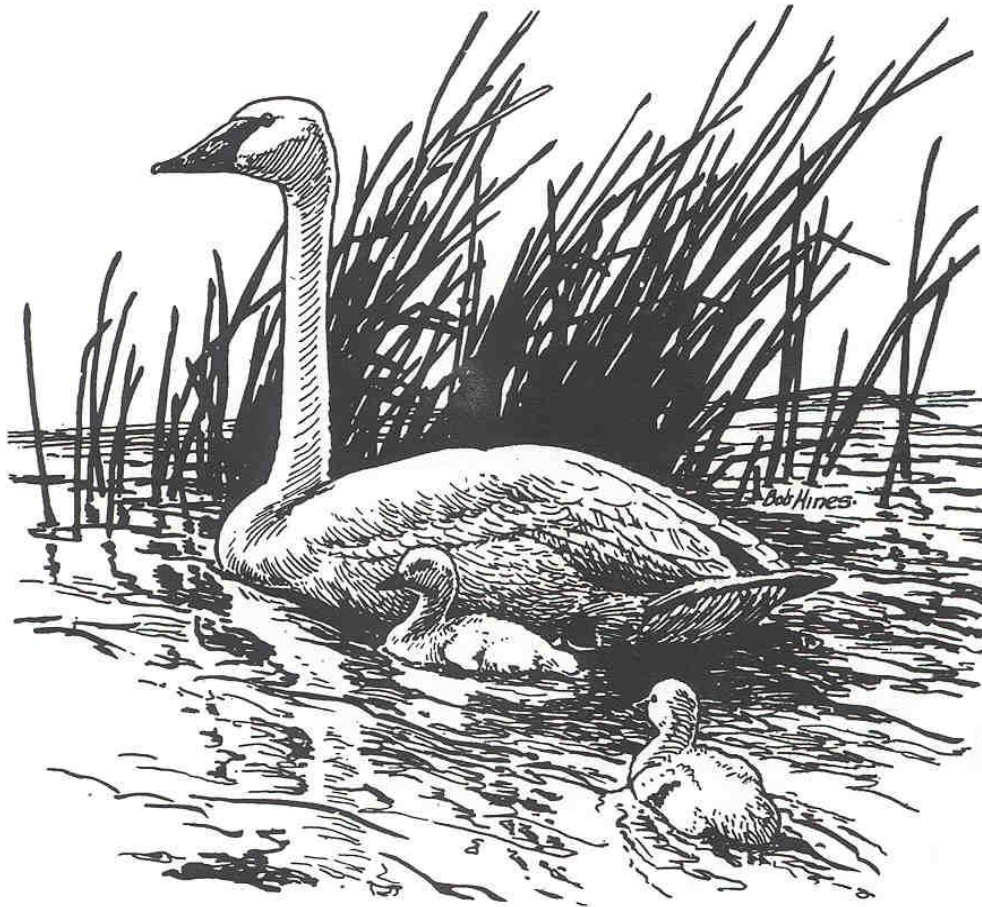
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U.S. Fish and Wildlife Service
Migratory Birds and State Programs
Mountain-Prairie Region
Lakewood, Colorado

November 29, 2004

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Abstract.— Observers counted 417 swans (white birds and cygnets) in the U.S. Breeding Segment of the Rocky Mountain Population of trumpeter swans during fall of 2004, a count identical to that from comparable areas last year. The numbers of white birds and cygnets in the tri-state region were essentially unchanged from respective counts in 2003. The numbers of young produced in each of the 3 states in which the Tri-state Area Flocks nest were nearly the same as those of last year. The number of white birds increased slightly in Idaho, decreased slightly in Wyoming, and was unchanged in Montana compared to counts in 2003. The number of birds in restoration flocks (Malheur and Ruby Lake National Wildlife Refuges only) also was nearly the same compared to the count from last year; the count of white birds decreased slightly, but production at Malheur improved. For the fourth consecutive year, swans at Ruby Lake produced no young. The tri-state area continues to experience severe drought conditions, with Palmer Drought Index values during early fall of 2004 among the lowest recorded since swan surveys were initiated in the 1930s.

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 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. 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 RMP Trumpeter Swan Implementation Plan (Pacific Flyway Study Committee 2002).

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 the 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.

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 are used to



Fig. 1. Approximate ranges of trumpeter swans during summer (from Caithamer 2001).

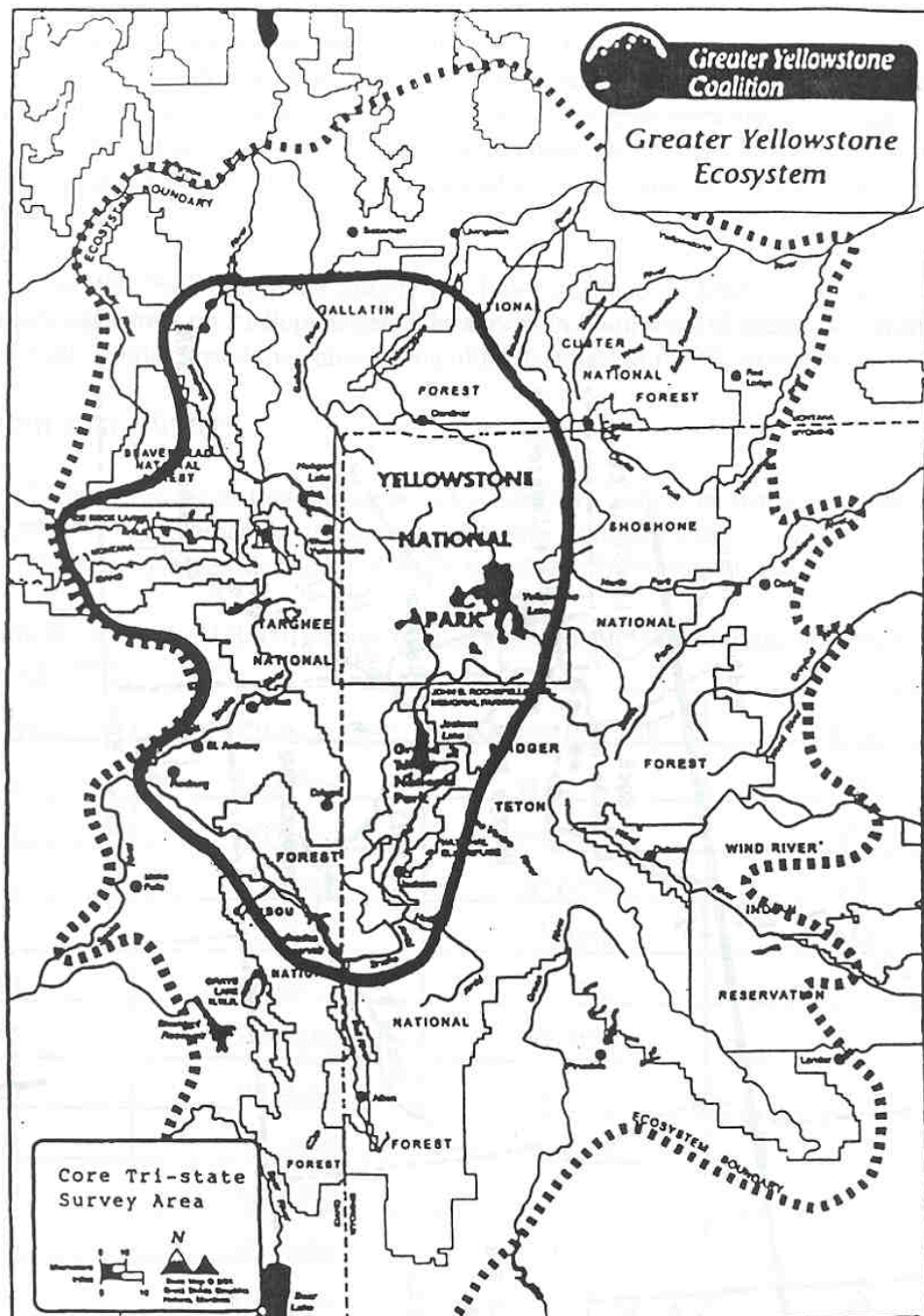


Fig. 2. Map showing the 'core' tri-state area of southeast Idaho, southwest Montana, and northwest Wyoming (provided by the Greater Yellowstone Coalition, Bozeman, Montana).

count numbers of swans in the tri-state area, in Nevada, and in the Summer Lake WMA and vicinity; ground surveys are used to count the number of swans at Malheur NWR and 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 2004, the survey was conducted during 12-24 September. Approximately 32 h of flight time and 5 h of ground survey time were required to complete the survey. Weather conditions during surveys generally consisted of clear skies and light winds; however, conditions in Idaho were overcast and windy the first day of the survey, causing the survey crew to discontinue flying for the day. The following day had overcast skies and good visibility, and the crew was able to survey the remaining areas. Many areas near the Summer Lake WMA where most swans of the Oregon flock are counted were not surveyed for the third consecutive year. Oregon will attempt to conduct these surveys in the future, but funding constraints and their ability to contract with suitable charter aircraft may preclude them from doing so in some years (B. Bales and M. St. Louis, Oregon Dept. of Fish and Wildlife, personal communication).

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. Counts from the current fall survey (2004) 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 2004, Wilkins and Otto 2004).

RESULTS AND DISCUSSION

Habitats continued to be extremely dry during summer and early fall. Similar to last year, during mid-June much of the summering range of RMP swans in the U.S. was in severe to extreme drought (Fig. 3). Last year, Palmer Drought Indices for southwest Montana (near the north-central portion of the core tri-state area) reached their lowest levels in almost 70 years, and indices were about the same during the summer of 2004. The drought intensified further as summer progressed, and the drought index surpassed previously recorded lows during July and August (Fig. 4). Survey biologists again reported that many wetland areas were dry in September (Appendix A).

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,

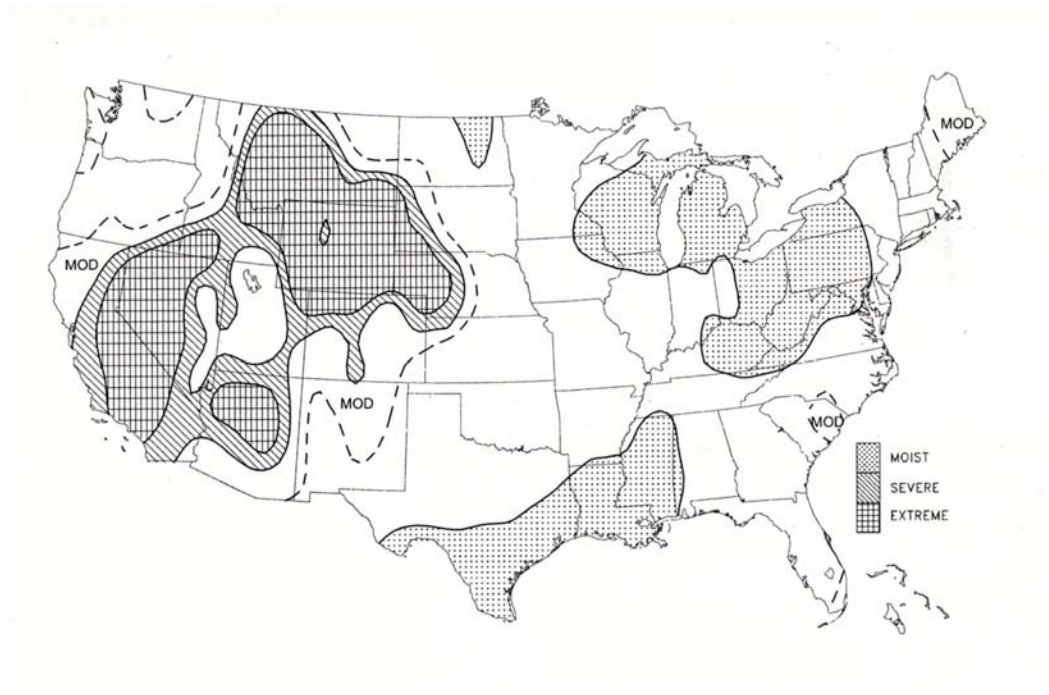


Fig. 3. Palmer Drought Index map for June 26, 2004 (Joint Agricultural Weather Facility 2004a).

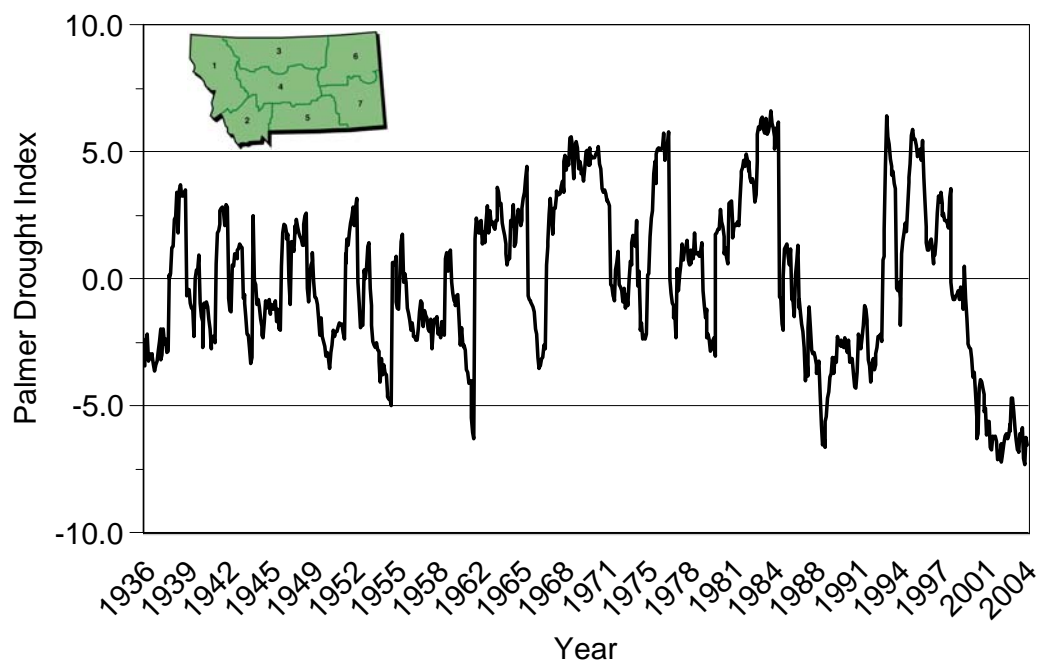


Fig. 4. Monthly Palmer Drought Indices for climate division 2 in southwest Montana (data from the National Climatic Data Center [<http://www1.ncdc.noaa.gov/pub/data/cirs/drd964x.pdsi.txt>]).

Table 1. Counts of trumpeter swans of the Rocky Mountain Population U.S. Breeding Segment during fall, 1967-2004.

Year	Tri-state Area Flocks			Restoration flocks			RMP/U.S. Breeding Segment		
	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
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	38b	7b	45b	311b	60b	371b
2003	291	95	386	30b	1b	31b	321b	96b	417b
2004	291	94	385	27b	5b	32b	318b	99b	417b

^a Blank denotes value not calculated because of incomplete survey.

^b Data for only Malheur NWR and the Nevada flock included; Summer Lake WMA survey not completed.

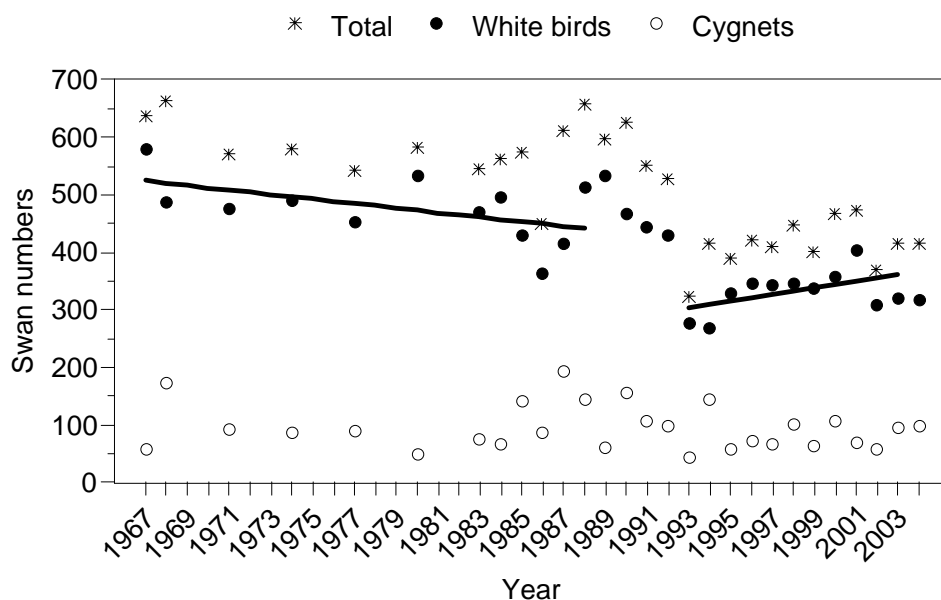


Fig. 5. Counts of swans in the RMP/U.S. Breeding Segment during the Fall Trumpeter Swan Survey, 1967-2004 (lines depict trends for white birds). The counts do not include those for the Summer Lake WMA (see text).

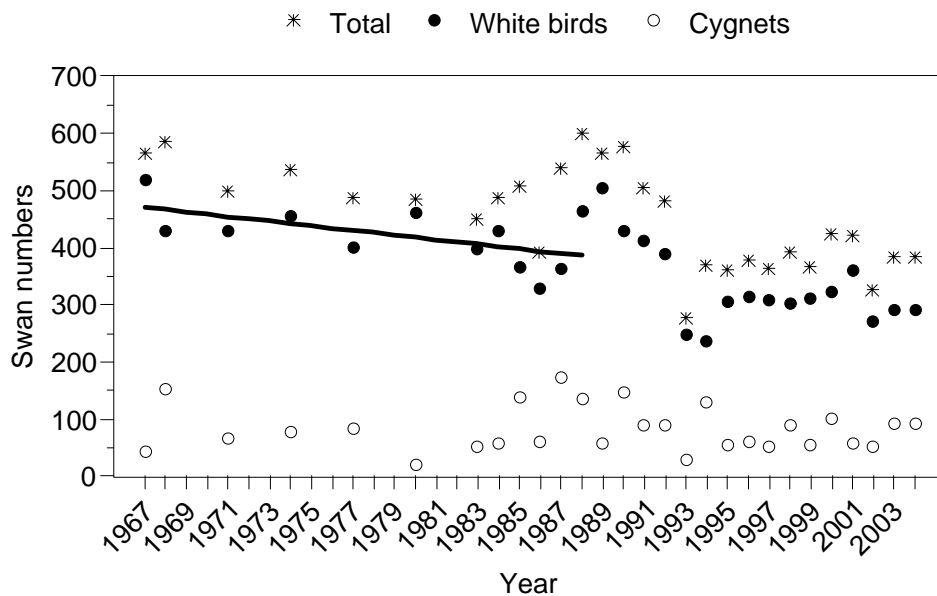


Fig. 6. Counts of swans in the Tri-state Area Flocks during the Fall Trumpeter Swan Survey, 1967-2004 (line depicts trend for white birds).

$P [\beta < 0] = 0.16$), 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).

Surveys of the Summer Lake WMA have not been conducted for the last 3 years. 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.

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 1993-2003, no trend in the growth rate for any portion of the RMP/U.S. Breeding Segment was evident, although a positive rate (+1.8% per year) for white birds was marginally significant (total count: $P = 0.17$; white birds: $P = 0.11$; cygnets: $P = 0.71$) (Fig. 5). Similarly, no trend was

Table 2. Counts of trumpeter swans of the Rocky Mountain Population U.S. Breeding Segment during fall, 1967-2004.

Year	Montana			Idaho			Wyoming			Malheur NWR			Summer Lake WMA			Nevada		
	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White 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
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 ^c	0 ^c	2 ^c	24	0	24
2003	89	29	118	100	27	127	102	39	141	11	1	12	2 ^c	0 ^c	2 ^c	19	0	19
2004	89	32	121	112	23	135	90	39	129	10	5	15	b			17	0	17

^aSwans translocated to Summer Lake WMA beginning in winter 1991; count from 1991 not used in analyses.

^bBlank denotes survey was not conducted.

^cIncomplete count; data not used in analyses.

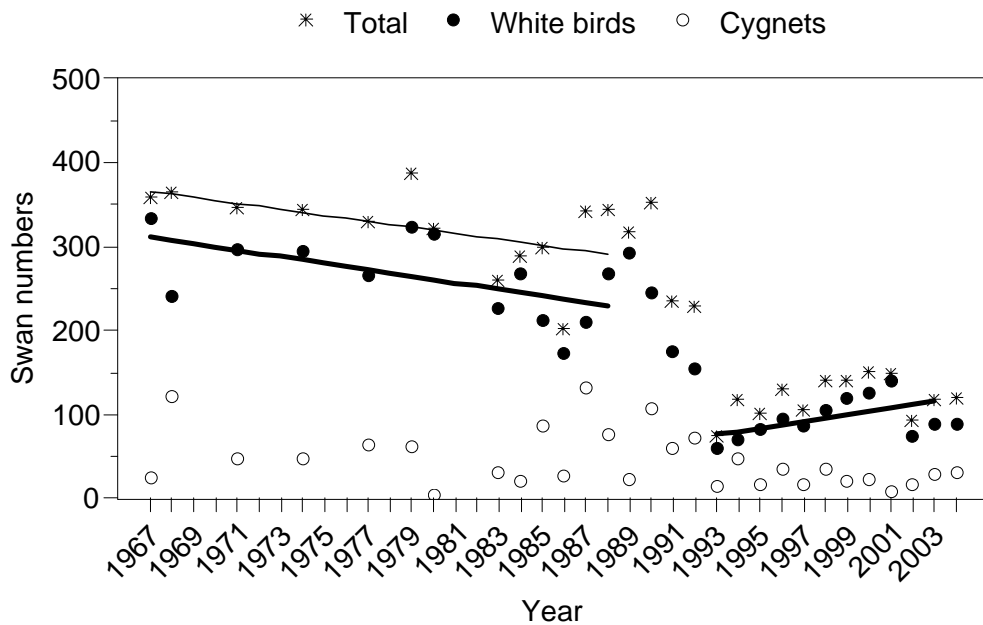


Fig. 7. Numbers of swans counted in Montana during the Fall Trumpeter Swan Survey, 1967-2004 (thin and thick lines depict trends for total swans and white birds, respectively).

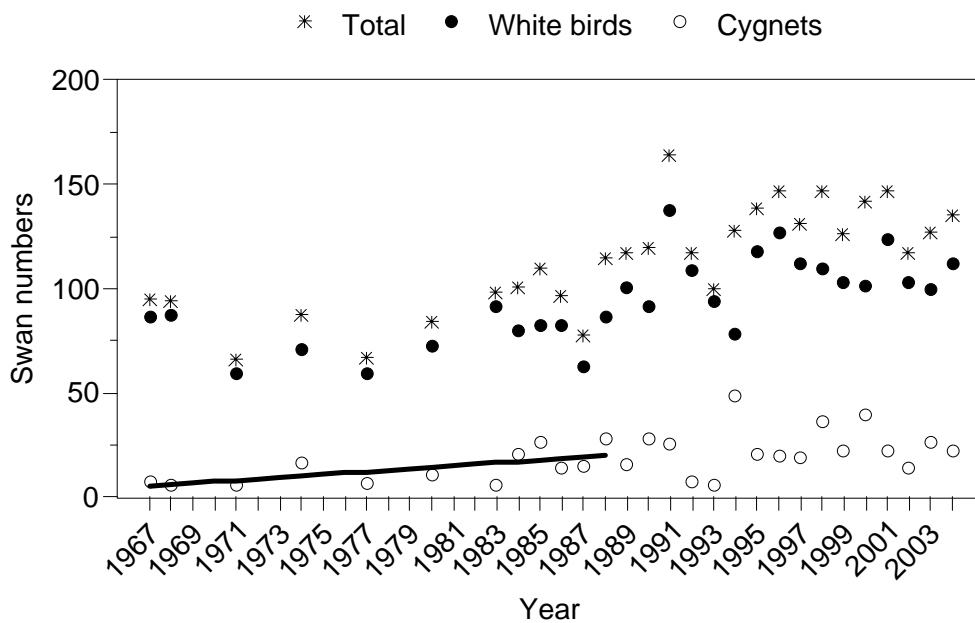


Fig. 8. Numbers of swans counted in Idaho during the Fall Trumpeter Swan Survey, 1967-2004 (line depicts trend for cygnet).

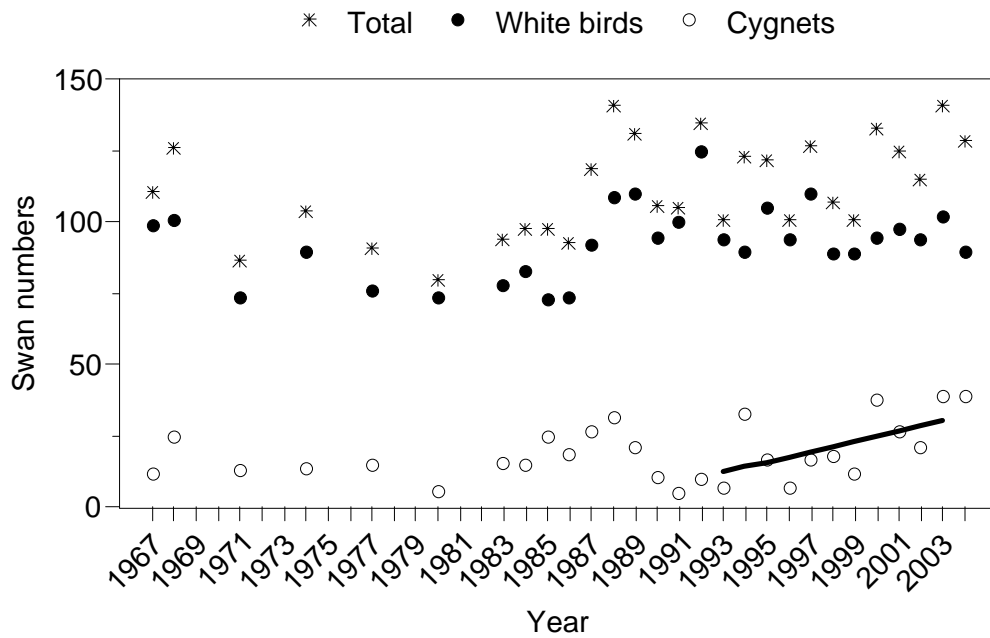


Fig. 9. Numbers of swans counted in Wyoming during the Fall Trumpeter Swan Survey, 1967-2004 (line depicts trend for cygnets).

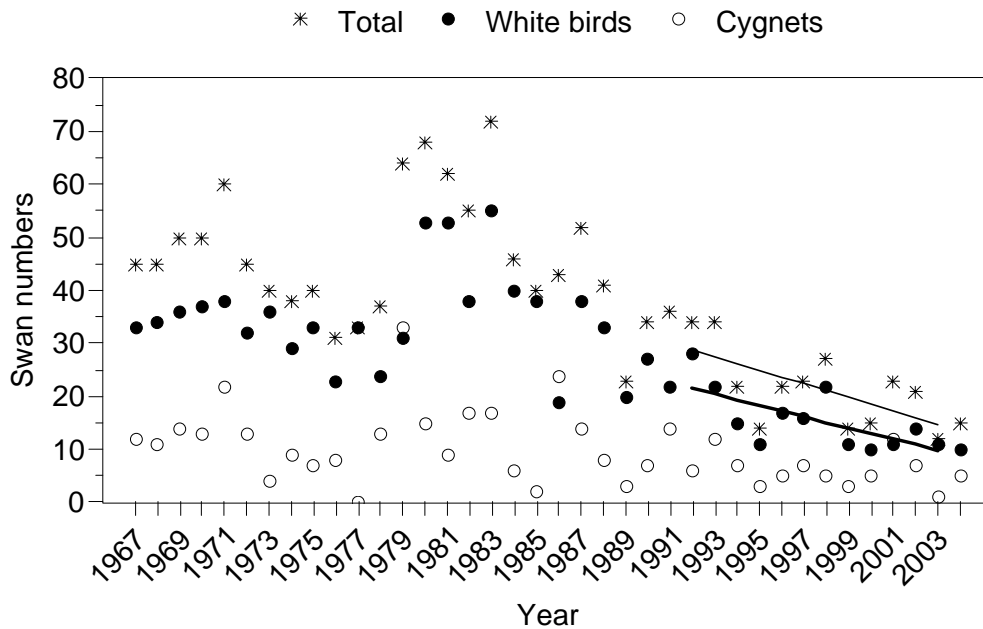


Fig. 10. Numbers of swans counted at Malheur NWR during the Fall Trumpeter Swan Survey, 1967-2004 (thin and thick lines depict trends for total and white birds, respectively).

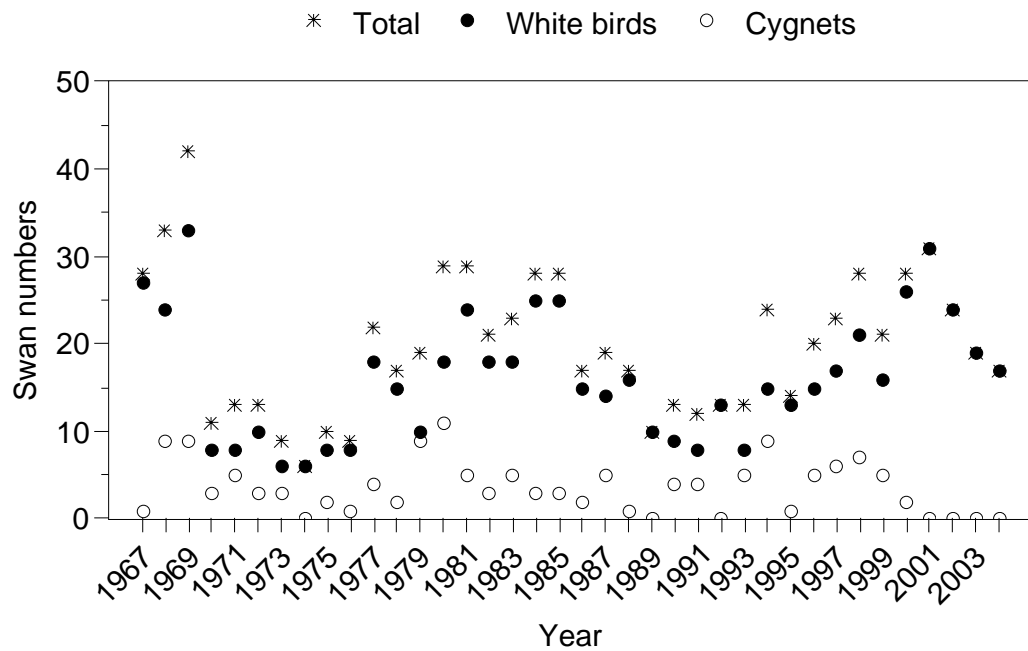


Fig. 11. Numbers of swans counted in the Nevada flock during the Fall Trumpeter Swan Survey, 1967-2004.

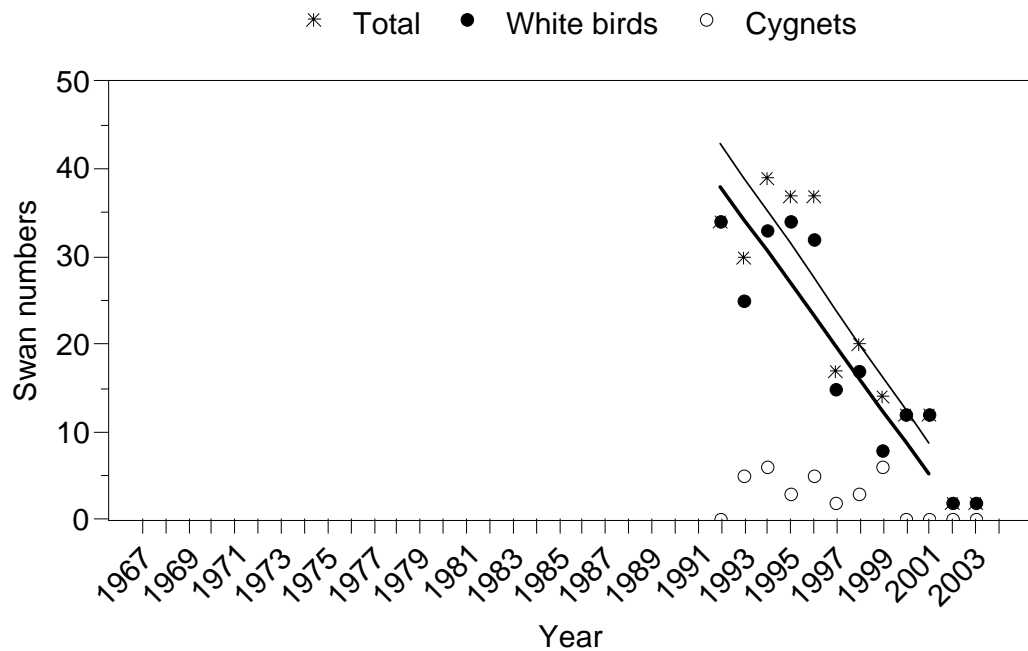


Fig. 12. Numbers of swans counted at Summer Lake WMA during the Fall Trumpeter Swan Survey, 1992-2004 (thin and thick lines depict trends for total swans and white birds, respectively).

evident for the growth rate of any component of swans in the Tri-state Area Flocks ($P \geq 0.14$) during the same period.

The rate of growth for total swans in Montana did not change during the 1993-2003 period ($P = 0.20$, Fig. 7). However, the average rate of growth for white birds increased (+4.3% per year, $P = 0.08$) during 1993-2003; the data for cygnets suggested no trend ($P = 0.50$). In Idaho, although slopes for all regressions (i.e., total birds, white birds, cygnets) were positive, none were statistically significant ($P \geq 0.49$) (Fig. 8). For Wyoming, data suggested no trends ($P \geq 0.16$) for total swans and white birds, but the rate for cygnets increased ($P = 0.07$) 10.2% per year on average during 1993-2003 (Fig. 9).

Because the Summer Lake WMA has not been surveyed during the last 3 years, 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 1992-2003. Total swans declined at a rate of 5.7% per year ($P = 0.04$) (Fig. 10), while the rate for white birds decreased 6.3% per year ($P = 0.07$). The rate for cygnets was unchanged ($P = 0.23$). At Summer Lake WMA, swans were translocated to the area beginning in winter 1991, so data from fall 1992-2001 are available. Regression analyses indicated substantial 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, $\bar{x} = 3.0$). The steep decrease in the number of swans at Summer Lake WMA suggests 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.

Counts for the entire time frame were used for analyses of the Nevada flock (see U.S. Fish and Wildlife Service 2003:7). No linear trends ($P \geq 0.14$) were evident for any component of the Nevada flock (Fig. 11), although a cyclic pattern may exist.

Results from the 2004 survey

During fall 2004, observers counted 417 trumpeter swans for the RMP/U.S. Breeding Segment, a count identical to that for comparable areas last year (Table 1, Fig. 5). Numbers of white birds (318) and cygnets (99) were essentially the same as those from 2003 (321 and 96, respectively).

Numbers of swans in all states of the Tri-state Area Flocks were similar to counts from last year. The number of white birds increased somewhat in Idaho and decreased slightly in Wyoming, while the count was unchanged in Montana. Counts of cygnets in each of the 3 states were very near (Idaho, Montana) or identical (Wyoming) to those of last year.

The count for restoration flocks (Oregon and Nevada flocks combined) this fall was similar to that of last year, but remained very low. The number of swans counted at Malheur NWR was only 15

birds. No surveys have been conducted the last 3 years at Summer Lake WMA, but habitat conditions have been very poor during that time and the drought has negatively impacted wetland availability (M. St. Louis, personal communication). The Ruby Lake area is experiencing a fifth consecutive year of drought. The number of swans in the Nevada flock decreased slightly again this year, and was the lowest count since 1995.

Production of cygnets in the tri-state region was the same as that of last year. An index¹ to production rate (i.e., cygnets/white birds) for Montana (0.360) and Wyoming (0.433) were higher than their long-term (i.e., 1967-2002) averages (0.267 and 0.201, respectively), while that for Idaho (0.205) was near the long-term average (0.208). Five cygnets were counted at Malheur NWR this year, an improvement from that of last year (1 cygnet), but still relatively low compared to the long-term average (10.2). For the fourth consecutive year, the Nevada flock fledged no cygnets. Although much of the area around Ruby Lake NWR was dry, swans historically produced young under such conditions (J. Mackay, personal communication); the reason for the lack of production from the Nevada flock is unknown.

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 this fall was the same as that of last year, as was the count for the Tri-state Area Flocks. Although the number of white birds in the 2004 count is above the average of recent (i.e., 1993-2003) counts, it remains below higher counts of a few years ago and below objectives stated in the management plan for this group of birds (Pacific Flyway Study Committee 2002). Nonetheless, we are encouraged that the count did not decline, despite worsening drought conditions in the core area of the Tri-state Area Flocks. The effect of the drought and its impact on these swans is unknown, but potentially can impact movements, recruitment, and survival. Survey results for the last 3 years have been fairly similar, and lower than counts from 2000 and 2001, suggesting that a recent decline in abundance may be real. However, because these lower counts are confounded with dramatic changes in environmental conditions, we

¹A better method to assess annual productivity is to estimate the number of young produced per breeding pair, because a proportion of white birds each year are subadults or adults that did not nest. Traditionally, such information was provided in this report. However, those data are not collected as part of the Fall Trumpeter Swan Survey. In past reports, methods describing how the data are collected, areas covered, and effort expended have not been reported. Further, issues regarding proprietary rights to those data have been raised. For these reasons the data have not been included in this report.

cannot discount the possibility that birds may have moved from the survey area during this severe drought.

ACKNOWLEDGMENTS

We would like to especially thank the personnel who conducted the surveys, a list of whom is provided in Appendix B. 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 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. A. Araya, J. Cornely, T. McEneaney, C. Mitchell, S. Patla, J. Mackay, R. Roy, and J. Warren reviewed a previous draft of this document.

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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, 2004.

Montana	White birds	Cygnets	Total	Pilot/observer/notes
<i>Red Rock Lakes NWR</i>				O: M. Parker; P: D. Chapman (9/24)
Upper Red Rock Lake	9	0	9	
Upper Lake Outlet to River Marsh	8	4	12	
Swan Lake	4	0	4	
Shambo Pond	2	2	4	
Lower Red Rock Lake	16	8	24	
West Pintail Ditch	0	0	0	
Widgeon Pond	2	0	2	
Sparrow Slough	0	0	0	
Sparrow Pond	0	0	0	
Culver Pond	0	0	0	
MacDonald Pond	0	0	0	
ElkSprings Creek	0	0	0	
Tucks Slough	0	0	0	
Red Rock Creek	0	0	0	
Antelope Pond	0	0	0	
Sora Pond	0	0	0	
Subtotal	41	14	55	
<i>Centennial Valley (CV)</i>				
Red Rock River	23	6	29	
Lima Reservoir	0	0	0	
Blake Slough	4	6	10	
Twin Forks wetland	0	0	0	
Conklin Lake	2	0	2	
Elk Lake	0	0	0	
7L Wetland	2	0	2	
Mud Lake	0	0	0	
Stibal Pond	0	0	0	
Huntsman Pond	0	0	0	
Scheid Stock Pond	0	0	0	
Jones Pond	0	0	0	
Winslow Pond	0	0	0	
Winslow Creek	0	0	0	
Bean Creek Pond (tooth pond)	0	0	0	
Subtotal	31	12	43	
<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	

Appendix A. (cont.)

Cliff Lake	0	0	0	
Wade Lake	0	0	0	
Tributary to Odell Creek	0	0	0	
Quake Lake	0	0	0	
Hebgen Lake (Madison Arm)	2	0	2	
Subtotal	2	0	2	
<i>Paradise Valley</i>				O: T. McEneaney; P: R. Stradley (9/22)
Call of the Wild Ranch	0	0	0	
Lower DePuy's	0	0	0	
Beaver Creek	1	0	1	
DePuy's	5	0	5	
Upper DePuy's	2	0	2	
Armstrong's	1	0	1	
Bailey's	2	3	5	
Brandis'	2	1	3	
Brandis' North Fish Ponds Slough	2	2	4	
Diamond B	0	0	0	
Dana's	0	0	0	
Emigrant Pond	0	0	0	
Subtotal	15	6	21	
Idaho				
<i>Island Park/Upper Henry's Fork</i>				O: C. Mitchell; P: G. Lust (9/12-13)
Henry's Lake	2	0	2	Low water levels
Henry's Lake Flat	0	0	0	
Big Springs to Mack's Inn	0	0	0	
Henry's Fork	0	0	0	Mack's Inn to Island Park Reservoir
Subtotal	2	0	2	
<i>Shotgun Valley</i>				
South Shore Island Park Reservoir	0	0	0	Very low water levels
Sheep Creek Reservoir	0	0	0	
Icehouse Reservoir	15	0	15	
Shotgun Reservoir	0	0	0	
North shoreline Island Park Reservoir	0	0	0	
Sheridan Reservoir	0	0	0	
Sheridan Creek (cabin with pond)	0	0	0	
Subtotal	15	0	15	

Appendix A. (cont.)

<i>Harriman State Park</i>				
Henry's Fork above Osbourne Bridge	2	0	2	
Henry's Fork below Osbourne Bridge	0	0	0	
Silver Lake	2	5	7	
Golden Lake	2	0	2	
Pond east-northeast of Golden Lake	0	0	0	
Thurman Creek	3	0	3	
Fish Pond	0	0	0	
Subtotal	9	5	14	
<i>Upper Henry's Fork Area</i>				
Buffalo River	0	0	0	
Henrys Fork-Box Canyon to Harriman State Park	0	0	0	Island Park Dam to Harriman State Park
Trude Siding-Pond/Elk Creek complex	0	0	0	Water level okay; little SAV
Tom's Creek	0	0	0	
Blue Spring	0	0	0	
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	Old unnamed wetland #3
Eccles Butte Northeast	0	0	0	Old Eccles East
Eccles wetland #1	0	0	0	Northeast of Fish Pond - dry
Eccles wetland #2	0	0	0	one mile west of Eccles #1 - dry
Eccles wetland #4	0	0	0	On state section; good water conditions
Eccles wetland #5	0	0	0	Dry
Swan Lake (west)	0	0	0	Good water conditions
Hatchery Butte Road ponds	0	0	0	Dry
Lilypad Lake (Pineview)	4	0	4	
Hatchery Butte	0	0	0	Dry
North of Hatchery Butte	0	0	0	Low water levels
Beaver Pond (Gerrit)	2	0	2	Good water conditions
Railroad Pond	0	0	0	Good water conditions
Pond northeast of Gerrit	0	0	0	Good water conditions
Mesa Marsh	2	0	2	Good water conditions
Northwest of Mesa Marsh	0	0	0	
Bear Lake and Cub Lake	2	0	2	Bear Lake good water conditions; Cub Lake dry
Twin Lakes	0	0	0	
Porcupine Lake	0	0	0	
Beaver Lake	0	0	0	Low water levels
Rock Creek	0	0	0	
Lower Goose Lake	0	0	0	
Upper Goose Lake	2	3	5	Good water conditions
Long Meadows	0	0	0	Low water levels
Swan Lake (east-Falls River)	0	0	0	
Steele Lake	0	0	0	
Putney Meadows	0	0	0	

Appendix A. (cont.)

Falls River Ridge Ponds	0	0	0	
Thompson's Hole	2	0	2	Very good water levels
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	Good water conditions
Tule Lake	2	0	2	Good water conditions
Subtotal	16	3	19	
<i>Teton Basin</i>				
McReynolds Reservoir	0	0	0	
Teton Basin	0	0	0	
Subtotal	0	0	0	
<i>Lower Henry's Fork</i>				
Upper Arcadia Reservoir	0	0	0	
Lower Arcadia Reservoir	0	0	0	
Marsh northwest of Upper Arcadia Reservoir	0	0	0	
Mikesell Reservoir 1	0	0	0	Low water levels
Mikesell Reservoir 2	0	0	0	Low water levels
Sand Creek Wildlife Management Area	5	8	13	Broods of 5 and 3
Wetlands west of Ashton	4	0	4	
Willow Creek ponds	0	0	0	
Chester Reservoir	0	0	0	
West of Chester Dam	0	0	0	
Singleton Ponds	2	0	2	
Lemon Lake	0	0	0	
Mackerts Pond	0	0	0	
Pond +/- 1 mile north of St. Anthony	0	0	0	
Deer Park Wildlife Management Area	0	0	0	West of Menan Buttes
Cartier Slough Wildlife Management Area	0	0	0	Northeast of Menan Buttes
Davis Lake	0	0	0	Dry
Egin Lakes	0	0	0	
Quayle's Lake	0	0	0	Good water conditions
Lower Henry's Fork to east of Market Lake	0	0	0	
Snake River	2	0	2	2 miles upstream from St. Anthony
Subtotal	13	8	21	
<i>Camas NWR</i>				
Toomey Pond	0	0	0	
2-Way Pond	0	0	0	
Rays Lake	0	0	0	
Center Pond	0	0	0	
Big Pond	2	5	7	
Avocet Pond	0	0	0	
Redhead Pond	3	0	3	

Appendix A. (cont.)

Mud Lake Wildlife Management Area	0	0	0	Good water conditions
Market Lake Wildlife Management Area	2	0	2	Low water levels
Subtotal	7	5	12	
<i>Grays Lake NWR</i>				
Shorty's Cabin	2	0	2	
Buck Lake (west of Bear Island)	0	0	0	
Big Springs Area	0	0	0	
Bishop Island	2	0	2	
B Riley Point (northwest of Bear Island)	2	0	2	
Outlet (main)	4	0	4	
Big Bend Marsh	2	0	2	
Brockman Creek	2	0	2	
Outlet Creek (north of road)	0	0	0	
North Canal	0	0	0	
South Canal	0	0	0	
Lakefront ponds (west of Headquarters)	2	0	2	
Kackley/Gravel Creek	0	0	0	
Beavertail	3	0	3	
Crane Reservoir (Little Valley)	0	0	0	
Chubb Springs	0	0	0	
Subtotal	19	0	19	
<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	4	0	4	
Chicken Creek wetlands	0	0	0	3 miles southwest of Blackfoot Reservoir dam
Chesterfield Reservoir	0	0	0	
Wetlands southwest of Chesterfield Reservoir	1	0	1	
Subtotal	5	0	5	
<i>Bear Lake NWR</i>				
Rainbow Unit	4	0	4	One pair on Rainbow Canal
Alder Unit	0	0	0	

Appendix A. (cont.)

Mud Lake Unit	13	0	13	
Salt Meadow Unit	0	0	0	
Dingle Unit	0	0	0	
West Canal Unit	0	0	0	
Bloomington Unit	1	0	1	
Subtotal	18	0	18	
<i>Fort Hall Bottoms</i>				
Head of Clear Creek	0	0	0	
American Falls Reservoir-northwest corner	5	0	5	
Kinney Creek	0	0	0	
Clear Creek above Sheepskin Road	0	0	0	
Clear Creek below Sheepskin Road	0	0	0	
Mouth of Portneuf River	0	0	0	
Slough west of Flying Y	1	2	3	
Sloughs along Broncho Road	0	0	0	
Diggie Creek	0	0	0	
Big Jimmy Creek	2	0	2	
Springfield Reservoir	0	0	0	
Sterling Wildlife Management Area	0	0	0	
Subtotal	8	2	10	
<i>Lower Snake River</i>				
American Falls Reservoir - Minidoka NWR	0	0	0	
C. J. Strike Reservoir	a			
Subtotal	0	0	0	
<i>Minidoka NWR</i>	0	0	0	
<i>Other Idaho</i>				
White Arrow Ponds (Bliss)				No swans reported
Fairfield Gravel Pit				No swans reported
Silver Creek (Picabo)				No swans reported
Oxford Slough Waterfowl Production Area	0	0	0	Dry
Swan Lake (Bannock County)	0	0	0	Good water conditions
Subtotal	0	0	0	
Wyoming				
<i>Yellowstone National Park</i>				O: T. McEneaney; P: R. Stradley (9/22)
Geode Lake	0	0	0	
Crescent Pond	0	0	0	

Appendix A. (cont.)

Slough Creek	0	0	0	
Tern Lake	0	0	0	
Yellowstone Lake west-northwest of Molly Island	0	0	0	
Yellowstone Lake south arm	0	0	0	
Beach Springs	0	0	0	
Heart Lake	0	0	0	
Yellowstone River, Alum-Grizzly Overlook	0	0	0	
Yellowstone River, north of Fishing Bridge	0	0	0	
Yellowstone River, Hayden Valley	2	0	2	
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	2	2	4	
Falls River	1	0	1	
Upper Boundary Lake	0	0	0	
7-Mile Bridge	2	0	2	
Swan Lake	2	0	2	
Robinson Lake	0	0	0	
Little Robinson	3	0	3	
West Robinson Lake	2	0	2	
Bechler River	0	0	0	
Lower Madison River	0	0	0	
Nymph Lake	0	0	0	
Grizzly Lake	0	0	0	
Obsidian Lake	0	0	0	
Floating Island Lake	1	0	1	
LittleTrumpeter Lake	1	0	1	
North Kidney Lake	0	0	0	
Grebe Lake	0	0	0	
Yellowstone Delta	0	0	0	
South Arm - Grouse	0	0	0	
East end of Mary Bay	0	0	0	
Delusion Pond	0	0	0	
Winegar Lake	0	0	0	
Fern Lake	0	0	0	

Appendix A. (cont.)

Tanager Lake	0	0	0	
Subtotal	16	2	18	
<i>Upper Snake River/Targhee National Forest</i>				O: S. Patla; P: G. Lust (9/15)
Ernest Lake	0	0	0	
Bergman Reservoir	3	0	3	Marsh SE of reservoir; reservoir dry
Indian Lake	2	5	7	Cygnets small compared to other broods in WY
Squirrel Meadows	2	0	2	By old ranch buildings
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	
Subtotal	7	5	12	
<i>Bridger-Teton National Forest-Jackson</i>				
Arizona Lake	0	0	0	
Blackrock Ranger Station pond/sloughs	0	0	0	
Enos Lake	0	0	0	
Bridger Lake				Did not fly; no swans observed this year
Atlantic Creek				Did not fly; no swans earlier in year
Lily Lake	0	0	0	
Pinto Pond	2	1	3	2 cyg. lost from brood; hatched on Half Moon Lake
Tracy Lake	0	0	0	
Burnt Fork Potholes	0	0	0	
Upper Slide Lake	2	1	3	Well-developed cygnet
Goose Lake	0	0	0	Dry
Grizzly Pond	0	0	0	Dry
Lower Slide Lake	0	0	0	
Soda Lake	0	0	0	Added 2004
Subtotal	4	2	6	
<i>Grand Teton National Park</i>				
Polecat Slough	0	0	0	
Flagg Ranch gravel pits	0	0	0	Water murky
Elk Ranch Reservoir	2	0	2	
Hedrick Pond	0	0	0	Water very low
Swan Lake	1	3	4	1 adult lost Aug., 2 white-morph cygnets
Christian Pond	0	0	0	
Glade Creek north	1	0	1	Marsh on Reclamation Road (Added back 2004)

Appendix A. (cont.)

Glade Creek south	2	0	2	1 cygnet lost
Steamboat Mountain	2	0	2	Pair in slough west side river
Jackson Lake north	1	0	1	Pool near Berry Creek
Jackson Lake south	6	0	6	
Two Ocean Lake	2	0	2	Nest failed this year due to flooding
Emma Matilda Lake	0	0	0	
Dam to Moran, Snake River	0	0	0	
Moran to Moose, Snake River				Not flown, wintering habitat
Subtotal	17	3	20	
<i>National Elk Refuge</i>				
Southwest Main Marsh	2	4	6	
Northwest Main Marsh (near overlook)	1	2	3	1 adult and 1 cygnet lost in August
Southeast Main Marsh	0	0	0	
Northeast Main Marsh	2	3	5	
Miller Springs	0	0	0	
Pierre Pond east	0	0	0	
Pierre Pond west	0	0	0	
Romney Pond #2	2	0	2	
Nowlin Ponds	3	0	3	Pair plus single bird Pond #1
Flat Creek north	0	0	0	
Subtotal	10	9	19	
<i>Jackson Area</i>				
Tucker Pits	0	0	0	
Skyline Pond (Puzzleface Ranch)	1	0	1	
Boyles Hill area	0	0	0	
Highway 89 winter pen	1	0	1	
South Park Unit, Wyoming Game & Fish Dept.	0	0	0	
Treatment Plant ponds	0	0	0	
Subtotal	2	0	2	
<i>Upper Green River (north of Warren Bridge)</i>				
Mosquito Lake	2	0	2	
Wagon Creek Lake	0	0	0	
Rock Crib Lake	0	0	0	
Mud Lake	0	0	0	Pair nested, 4 cygnets lost
Roaring Fork Pond				Not flown due to fog; probably dry
Dollar Lakes	0	0	0	
Upper Green River above Big Bend	0	0	0	
Green River Big Bend to Black Butte	2	5	7	New nest site; well-developed cygnets
Green River Black Butte to Warren Bridge	2	0	2	Pair on rock in river south of Black Butte
Spade Slough	0	0	0	
New Fork Potholes/Marsh Creek	0	0	0	

Appendix A. (cont.)

Kendal Wetland	0	0	0	
New Fork River (north of highway 191)	0	0	0	Flown 9/14 crane survey
Kitchen Reservoir north	4	0	4	Flown 9/14 and 9/15
Kitchen Ranch Reservoir main	2	4	6	Well-developed cygnets
Soda Lake area	0	0	0	Water level good in wetlands
Subtotal	12	9	21	
<i>New Fork River & Big Sandy to Farson area</i>				
New Fork River Pinedale to Boulder	2	0	2	Pair on wetland north of highway
Boulder Sloughs	0	0	0	
Oliver Slough (Barden)	2	0	2	Did not nest this year
Swift Reservoir	0	0	0	
New Fork to confluence with Green	0	0	0	
Big Sandy/Big Bend	0	0	0	Flown 9/14 crane survey
Big Sandy/Eden reservoirs	0	0	0	Flown 9/14
Farson area	0	0	0	Flown 9/14; reservoir used in past dry
Subtotal	4	0	4	
<i>Seedskaadee NWR (SNWR) and lower Green River</i>				
Main Marsh Hawley Unit, Pool 6, SNWR	0	0	0	
Main Marsh Hawley, Pool 1, SNWR	2	0	2	
Main Marsh Hawley, Pool 2, SNWR	0	0	0	
Main Marsh Hawley, Pool 3, SNWR	2	4	6	
Main Marsh Hawley, Pool 4, SNWR	2	5	7	
Main Marsh Hawley, Pool 7, SNWR	0	0	0	
North Marsh Hamp, SNWR	0	0	0	Mostly dry
Sagebrush Wetland, SNWR	1	0	1	L. Glass ground count
Dunkle Wetland, SNWR	8	0	8	L. Glass ground count
Green River south of Highway 28, SNWR	0	0	0	
Green River Highway 28 to dam, SNWR	0	0	0	Many pelicans and geese
Fontenelle Reservoir	0	0	0	
Big Piney cutoff, Green River	0	0	0	Murky; flown 9/14
Dry Piney Creek area, Green River	0	0	0	Flown 9/14
La Barge pond (private)	1	0	1	Old oxbow, flew 9/14
Daniel, Cottonwood Creek area	0	0	0	Flown 9/14
McNaughton Reservoir, Hamm's Fork	0	0	0	Flown 9/14
Hamm's Fork north of Kemmerer	0	0	0	
Subtotal	16	9	25	
<i>Salt River</i>				
Palisades Reservoir, Targhee NF	0	0	0	
Kibby wetland, Alpine	2	0	2	Nested; no cygnets

Appendix A. (cont.)

Salt River, Alpine to Freedom	0	0	0	9/15 flown crane survey, Rod Drewien
Salt River, Freedom to Afton	0	0	0	9/15 flown crane survey, Rod Drewien
Subtotal	2	0	2	
<i>Other Wyoming</i>				
Swamp Lake, Sunlight Basin	0	0	0	Single bird seen in July but not September
Colony Site, eastern Wyoming	0	0	0	Shilo Comeau flight report out of Lacreek
Subtotal	0	0	0	
Nevada				O: J. Mackay, M. Collins; P: R. Cassinelli (9/13)
Ruby Lake NWR	17	0	17	
Franklin Lake				Dry
Oregon				
Malheur NWR	10	5	15	R. Roy (9/13)
Summer Lake Wildlife Management Area				
Lower Chewaucan Marsh				
Upper Chewaucan Marsh				
Paulina Marsh				
Sycan Marsh				
Upper Williamson River				
Klamath Marsh NWR				
Ward/Lily Lakes				
Swan Lake Valley				
Sprague River				
Upper Crooked River				
Thompson Reservoir				
Rivers End Ranch				
Whiskey Creek				

^aBlank denotes area not surveyed.

Appendix B. Personnel who conducted the 2004 Fall Trumpeter Swan Survey in the U.S.

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

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

Montana (Paradise Valley)

Observer: T. McEneaney (Yellowstone National Park)
Pilot: R. Stradley (Yellowstone National Park)

Idaho

Observer: C. Mitchell (Gray's Lake NWR)
Pilot: G. Lust (Mountain Air Research)

Wyoming

Observer: S. Patla (Wyoming Game and Fish Department)
Pilot: G. Lust (Mountain Air Research)

Wyoming (Yellowstone National Park)

Observer: T. McEneaney (Yellowstone National Park)
Pilot: R. Stradley (Yellowstone National Park)

Ruby Lake NWR and vicinity

Observers: J. Mackay and M. Collins (Ruby Lake NWR)
Pilot: R. Cassinelli (El Aero Services)

Malheur NWR

R. Roy (Malheur NWR)
