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**TRUMPETER SWAN SURVEY
of the
HIGH PLAINS FLOCK,
INTERIOR POPULATION**

Winter 2005



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Martin, South Dakota

July 7, 2005

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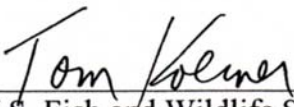
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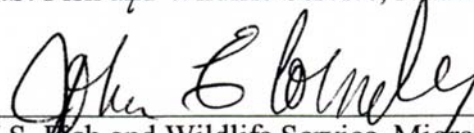
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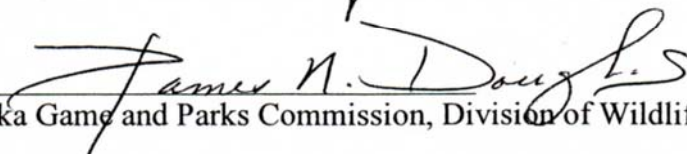
Approved:



U.S. Fish and Wildlife Service, National Wildlife Refuge System



U.S. Fish and Wildlife Service, Migratory Birds and State Programs



Nebraska Game and Parks Commission, Division of Wildlife

Introduction

Re-introduction of trumpeter swans at Lacreek National Wildlife Refuge (NWR) began in the early 1960s to restore extirpated populations that existed in this region prior to settlement. Cygnets from Red Rock Lakes NWR were translocated to Lacreek to establish the High Plains (formerly, Lacreek) flock of the Interior Population. Since then, the number of birds comprising the High Plains flock has increased steadily and their range has expanded. Swans are now commonly observed throughout most of the western and parts of the eastern Sandhills of Nebraska (Fig. 1).

Prior to the winter of 2005, aerial surveys were conducted by staff stationed at Lacreek NWR to quantify the number swans in the High Plains flock. Beginning this winter, in coordination with the annual Mid-Winter Survey ([MWS], Blohm 1989), counts of trumpeter swans were obtained in accordance with management plans for these swans (Lacreek National Wildlife Refuge 1982, Subcommittee on the Interior Population of Trumpeter Swans 1997), and the special swan surveys conducted by Lacreek staff were discontinued. Each plan specifies population objectives and management strategies for monitoring population status. Surveys are conducted annually to assess wintering-ground abundance and distribution of swans.

Survey Area and Methods

Rivers, creeks and other areas in western Nebraska and southwestern South Dakota were surveyed during 2-10 January, 2005 by both air and ground to obtain counts of trumpeter swans. Two high-winged aircraft (a Cessna 172 and 182) were used on the majority of the survey and flew at approximately 30-90 meters above ground level at an airspeed of approximately 60 kph. One observer was used for portions of the Snake and Merritt Reservoirs, while two observers were used for the portions along the North Loup, Middle Loup and North Platte Rivers, and for Blue and Birdwood Creeks. Numbers of trumpeter swans and other waterfowl were estimated by ocular estimation. Swans were classified as cygnets if they contained gray plumage; adults and subadults were grouped as 'white birds'. Counts were not adjusted for birds present but not seen by aerial observers. Ground counts from vehicles or on foot also were conducted. Although counts from aerial surveys were used as the official count, counts from aerial surveys were coordinated with and corroborated with ground counts when possible. Rivers were

partitioned into identifiable segments (e.g., bridges) to facilitate counting and recording of swans.

Habitat Conditions Prior to Survey

Precipitation was average or below average for the fall, and continued drought plagued western Nebraska and southwestern South Dakota (Table 1). Water levels in Sandhill lakes, the North Platte River and in other reservoirs and lakes were below average. However, water flows in the North Platte River were slightly better than in 2003 and 2004. Additionally, unlike 2003 and 2004, there were no major cold fronts that resulted in major migration of ducks and geese and freezing of Sandhill lakes and other reservoirs. Mild temperatures prevailed during most of October, November and December (Table 1). Waterfowl migration appeared to be protracted due to the warm temperatures. The first migrant swans arrived at Lacreek NWR in October and found good food resources with abundant submerged aquatic vegetation and with 100% open water throughout the refuge.

Survey Conditions

Survey conditions were considered good for the winter survey, with arrival of cold temperatures that concentrated swans on remaining open water areas. Mild temperatures and open water on Sandhill lakes probably disperses swans more and leads to less accurate counts. The primary wintering areas were surveyed and conducted in a relatively short period of time (9 days). During the survey period, temperatures fell below freezing. At the completion of the survey there was approximately 15% open water at Lacreek NWR, and most Sandhill lakes froze over. Actual weather conditions the final day of the survey were winds at 3 - 6 kph from the southeast with temperatures ranging about -6 to -9 °C. Skies were cloud-free, but 10 cm of new snow fell the previous night.

Results

We counted 423 trumpeter swans in the High Plains flock during the 2005 winter survey (Table 2). Most of the swans were observed on the Snake and North Loup rivers (Table 2). Birdwood and Blue creeks also held significant numbers of swans during winter 2005 (Table 2). The 2005 winter count was a 5% increase in number from 2004 ($n = 401$), the highest count

Table 1. Temperature (°C) and precipitation (cm) amounts for Alliance and Valentine, Nebraska during fall 2004.

Month	Alliance				Valentine			
	Temperature		Precipitation		Temperature		Precipitation	
	Range 2004	Mean 2004	Total 2004	Long-term average	Range 2004	Mean 2004	Total 2004	Long-term average
October	-5 to 26°	9.2°	3.96	2.29	-5 to 26°	10.2°	2.16	3.05
November	-28 to 22°	0.2°	1.04	1.52	-28 to 22°	10.2°	2.16	1.78
December	-30 to 20°	-1.7°	0.05	1.02	-30 to 20°	-6.1°	1.07	0.76

since 1999, and the second highest count recorded (Appendix A). There was little difference in the numbers of trumpeter swans counted between the fall 2004 and winter 2005 surveys (Appendix B). In addition to High Plains trumpeter swans, 5 other swans were observed during the MWS on the Loup River (Table 3). Given their more easterly distribution, it is likely that these birds are from restoration efforts in other states (e.g., Iowa). However, their origin was not investigated or confirmed.

The number of white trumpeter swans observed during winter surveys continues to increase, similar to the trend for fall counts (Fig. 2). However, trends in cygnets counted in fall and winter surveys show little increase (Fig. 2). Nonetheless, counts of cygnets from both surveys appear to track each other closely, exhibiting similar peaks and valleys of abundance (Fig. 2). However, the ratio of cygnets to white birds in winter counts indicates a steady decline since 1976 (Fig. 3).

Discussion

Although drought has occurred in most of the main U.S. nesting areas for trumpeter swans during the past several years, the High Plains trumpeter swan flock appears not to have been negatively impacted. Drought may not affect trumpeter swans nesting in the Sandhills to the same degree as in other western areas of the U.S. (e.g., the tri-state area of Montana, Idaho, and Wyoming), because they prefer large, more permanent lakes that are the last to dry up. Additionally, creeks and rivers that harbor most of the wintering High Plains flock are spring-fed and are less susceptible to drying up than river and creek systems dependent on runoff.

Although counts of white birds in both fall and winter surveys continue to increase, the cygnet production rate appears to be steadily declining. The decline could be the result of the flock reaching the carrying capacity of the landscape, a reduction in the quality of habitats, an increased number of non-breeding pairs or subadults, or other factors. Continued monitoring of this flock and directed research is needed to determine likely causes.

Table 2. Areas surveyed and the number of trumpeter swans observed during the 2005 winter trumpeter swan survey, Nebraska and South Dakota.

Area Surveyed	Number of Swans Observed		
	White birds	Cygnets	Total
North Loup River			
Taylor to Almeria	0	0	0
Almeria to Brewster	2	1	3
Brewster to Purdum	0	0	0
Purdum to HWY 83	0	0	0
HWY 83 to Brownlee	0	0	0
Brownlee to HWY 97	35	11	46
HWY 97 to end	44	12	56
Subtotal	81	24	105
Middle Loup River	0	0	0
Calamus River – Brown County	4	3	7
Snake River			
Boardman arm of Merritt Res	0	0	0
Snake arm of Merritt to HWY 61	132	27	159
HWY 61 to end	17	0	17
Subtotal	149	27	176
Birdwood Creek	55	26	81
Blue Creek	42	11	53
Lake McConaughy	1	0	1
Total	332	91	423

Table 3. Location and numbers of other trumpeter swans observed during the 2005 Mid-Winter Survey that are not considered part of the High Plains flock.

Area Surveyed	Number of Swans Observed		
	White birds	Cygnets	Total
Loup River			
Columbus to Monroe	2	0	2
Rockville to Loup City	2	1	3
Total	4	1	5

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R. Walters, T. Krolikowski, J. Dinan, J. Hoffman and K. Andresen conducted aerial observations, and D. Benning, F. Mueller, and B. Kilmer piloted aircraft. Numerous Nebraska Game and Parks Commission Conservation Officers and Wildlife Division personnel also assisted with ground observations.

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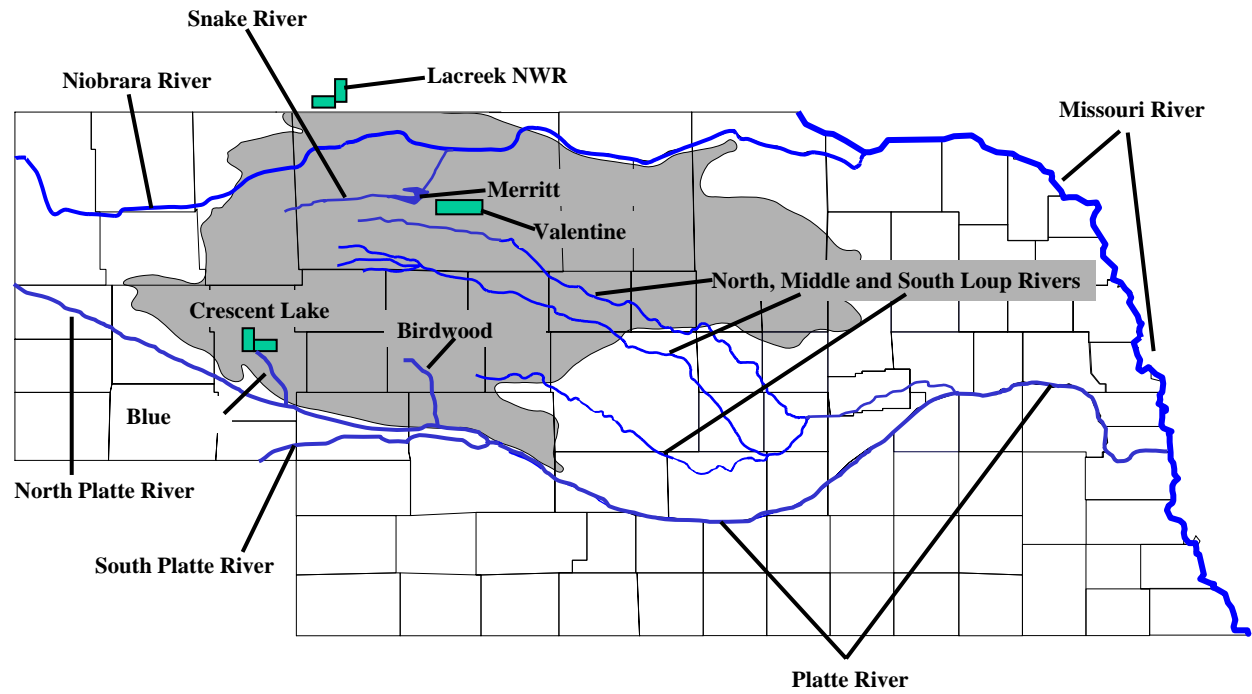


Figure 1. Location of the Sandhills of Nebraska (shaded portion), Lacreek National Wildlife Refuge, and important wintering locations of trumpeter swans.

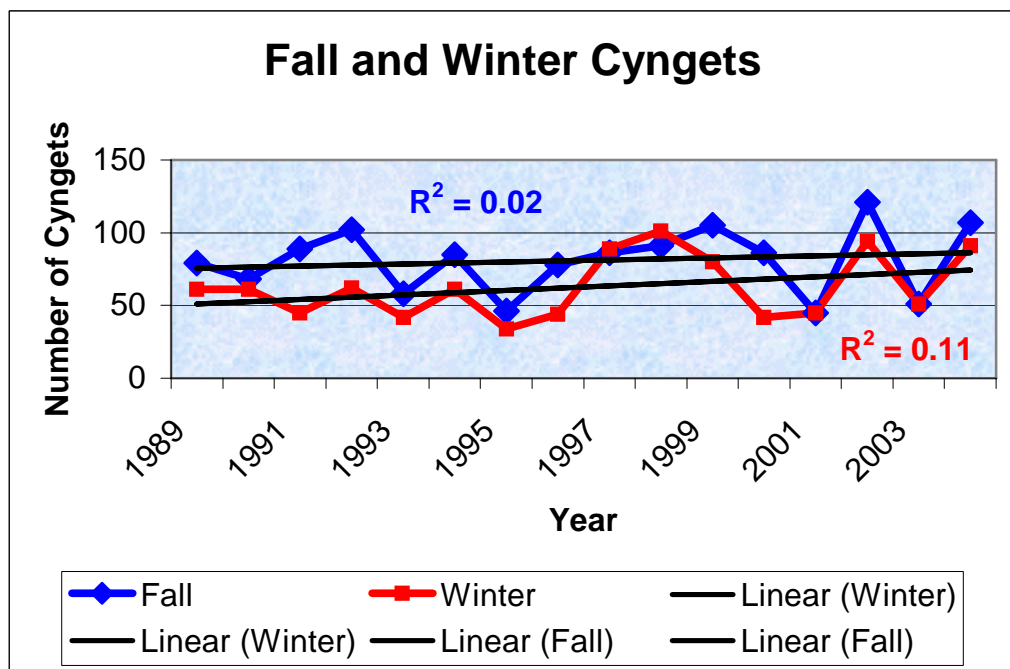
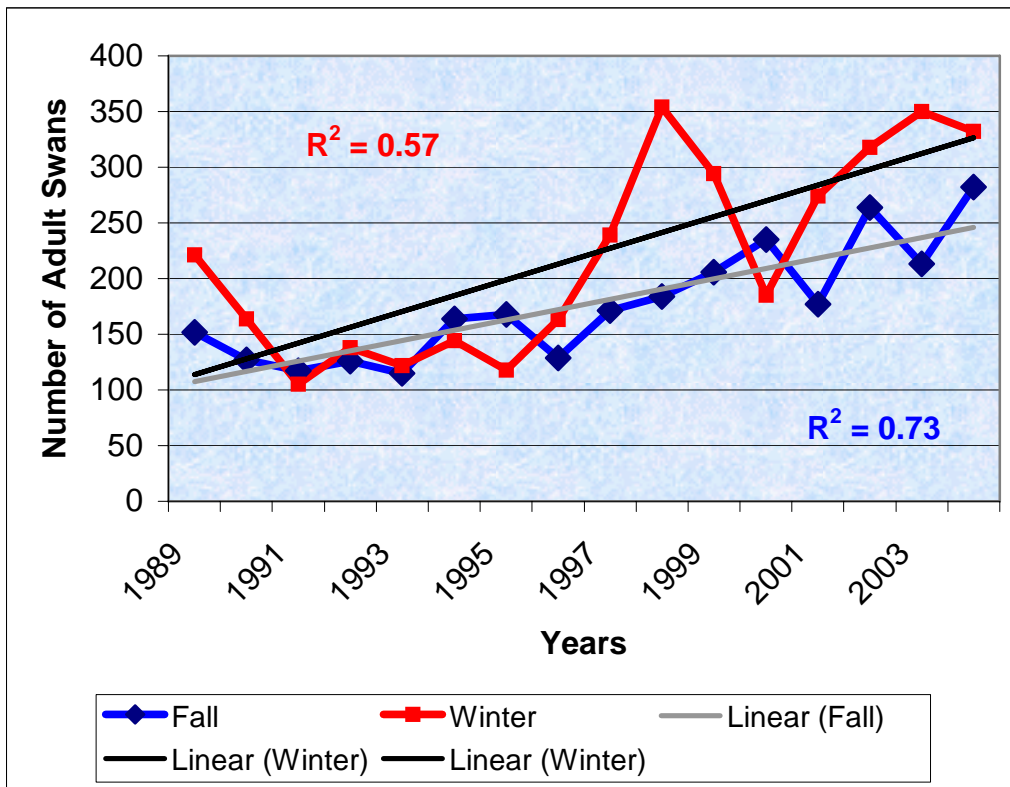


Figure 2. Trends of adults and cygnets in fall and winter counts, High Plains flock, 1989-2004.

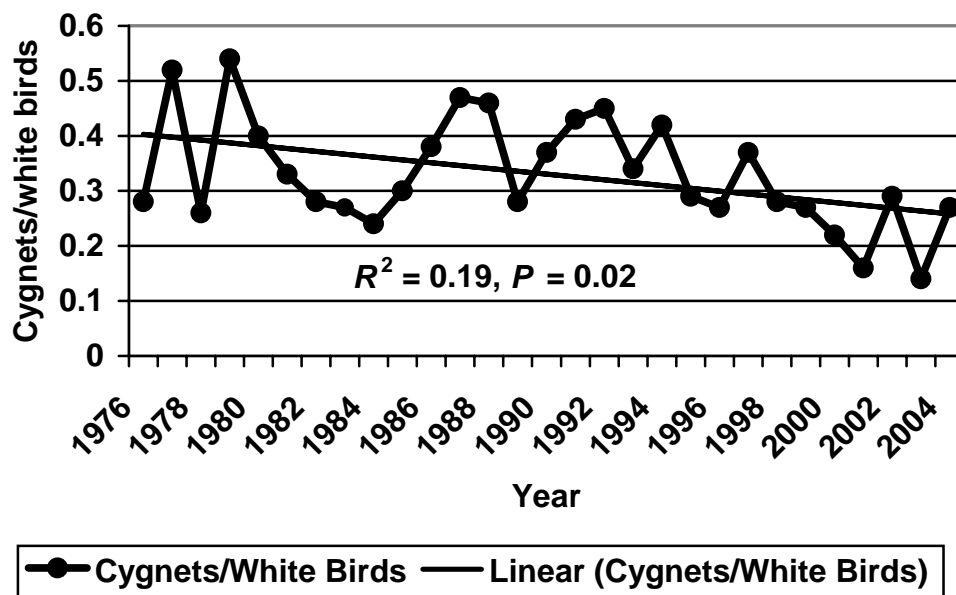


Figure 3. Ratio of cygnets/white birds from winter counts, High Plains flock, 1976-2004.

Appendix A. High Plains flock trumpeter swan Fall and Mid-winter Survey results, 1960-2005.

Year ^a	Fall Survey			Winter Survey		
	White birds	Cygnets	Total	White birds	Cygnets	Total
1967/1968	30	21	51	b	b	57
1968/1969	b	b	76	b	b	57
1969/1970				b	b	85
1970/1971	c					
1971/1972						
1972/1973				b	b	112
1973/1974				102	36	138
1974/1975						
1975/1976				b	b	139
1976/1977				146	41	187
1977/1978				126	65	191
1978/1979				138	36	174
1979/1980				119	65	184
1980/1981	120	44	164	140	56	196
1981/1982	104	54	158	172	58	230
1982/1983				167	48	215
1983/1984				206	57	263
1984/1985	116	65	181	190	47	237
1985/1986	95	63	158	144	43	187
1986/1987	103	74	177	166	63	229
1987/1988	110	81	191	182	86	268
1988/1989				169	78	247
1989/1990	152	79	231	221	61	282
1990/1991	127	68	195	164	61	225
1991/1992	117	89	206	105	45	150
1992/1993	126	102	228	138	62	200
1993/1994	115	58	173	122	42	164
1994/1995	164	85	249	144	61	205
1995/1996	168	46	214	118	34	152
1996/1997	129	78	207	163	44	207
1997/1998	171	86	257	239	89	328
1998/1999	184	91	275	354	101	455
1999/2000	206	105	311	294	80	374
2000/2001	235	86	321	185	42	227
2001/2002	177	45	222	274	45	319
2002/2003	264	121	385	318	94	412
2003/2004	213	51	264	350	51	401
2004/2005	282	107	389	332	91	423

^aFall survey/Winter survey.

^bCounts not divided into white birds and cygnets.

^cBlanks denote survey was not conducted or counts were not available.

Appendix B. Differences in fall and winter counts of High Plains flock of trumpeter swans, 1980-2005.

Year ^a	Fall	Winter	Difference	
			<i>n</i>	%
1980	164	196	32	16
1981	158	230	72	31
1982	b	215		
1983		263		
1984	181	237	56	24
1985	158	187	29	16
1986	177	229	52	23
1987	191	268	77	29
1988		247		
1989	231	282	51	18
1990	195	225	30	13
1991	206	150	-56	37
1992	228	200	-28	14
1993	173	164	-9	5
1994	249	205	-44	21
1995	214	152	-62	41
1996	207	207	0	0
1997	257	328	71	22
1998	275	455	180	40
1999	311	374	63	17
2000	321	227	-94	41
2001	222	319	97	30
2002	385	412	27	7
2003	264	401	137	34
2004	389	423	34	8

^aWinter counts were matched to nearest fall count (e.g., 2004 row is for the 2004 Fall Survey and the 2005 Mid-winter Survey).

^bBlanks denote survey was not conducted or counts were not available.