TRUMPETER SWAN SURVEY
of the
HIGH PLAINS FLOCK,
INTERIOR POPULATION

Winter 2008

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Introduction

Re-introduction of trumpeter swans (*Cygnus buccinator*) at Lacreek National Wildlife Refuge (NWR) began in the early 1960s to restore extirpated populations that existed in this region prior to settlement (Monnie 1966). 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 in 2005, 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. The current management plan for this flock (Comeau-Kingfisher and Koerner 2005) specifies population objectives and management strategies for monitoring population status. Winter 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 5-8 January 2009 by both air and ground crews 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 the Snake River and Merritt Reservoir, but two observers were used for 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 if not covered by the aerial portion. Where counts were made from both aerial and

ground surveys, aerial counts were used as the official count, but were coordinated with and corroborated by ground counts when possible. Rivers were partitioned into identifiable segments (e.g., reaches between bridges) to facilitate counting and recording of swans. The primary wintering areas were surveyed within a relatively short period of time to minimize biases in counts due to localized movements of birds.

Habitat Conditions Prior to Survey

Temperatures were normal for October with no unusual extreme weather events and normal to slightly above normal for early November. A major cold front occurred during mid-November (11/20/2008), likely freezing most open water areas. A severe arctic front hit portions of the state on 14 December and lasted until 24 December. Below-average temperatures, snowfall, and the formation of ice along waterways in November and December likely concentrated birds in open water areas, spring-fed creeks and rivers, and reservoirs. In late December, temperatures moderated and melted most snow accumulations, although little open water was accessible to waterfowl.

Precipitation in the survey area did not follow recent trends and was above historic values this winter (Fig. 2). Stream flows in creeks and rivers were slightly better than during 2003-2008. Water levels in the Sandhill lakes and other reservoirs and lakes and watershed ponds increased slightly from previous years.

The first swans began to arrive at Lacreek NWR in late September. The number of swans on the refuge increased through early November, when a record high of 384 trumpeter swans were counted (8 November). Swans were observed on the refuge until mid-December, although the highest count of swans was observed 2-3 weeks earlier than normal in 2008 due to an earlier freeze-up (mid-November) on the refuge. Swans were found on pools 5, 6, 7, 8, and 9. Arrowhead (*Sagittaria* spp.) was available for forage on pools 5, 6, 7, and 8. Other sub-aquatic vegetation species and wild rice (*Zizania aquatica*) was available on pools 5 and 6, with wild rice also being available on pool 8. Water management in the developed wetland units will continue to emphasize arrowhead and other preferred submerged aquatic plant species preferred by waterfowl, and the units will be flooded to preferred foraging depths from October through March on approximately 25% of the units in during fall 2008.

Survey Conditions

Survey conditions were considered good for the winter survey, with adequate open water areas in lakes and rivers. Swans were concentrated in open water areas, the majority observed in the Merritt Reservoir area (Table 1). No swans were observed at Lacreek NWR due to early freeze-up conditions. Below-average temperatures and ice on Sandhill lakes concentrated birds on open water and reservoirs moreso than in years past and probably increased the accuracy of the total swan count. Drought conditions seemed to have subsided during fall 2008 (Fig. 1) in the survey area. The primary wintering areas were surveyed during a relatively short period of time (4 days); therefore, we assume double counting was limited or non-existent.

During the week of the survey, there was little to open water at Lacreek NWR (approximately 10%) and most Sandhill lakes. Weather conditions during the survey included winds at 0-8 kph and temperatures near 0 ^{o}C. The month of December was colder than past years as there was a large ice/snow even occurring in November.

Results

We counted 639 trumpeter swans in the High Plains flock during the 2008 winter survey (Table 1), compared to 593 in 2007 (Appendix A; Comeau and Vrtiska 2008). In 2008, most swans were observed on the North Loup River and on or near Merritt Reservoir (Table 1). The North Loup, North Platte, and Calamus Rivers along with Birdwood and Blue Creeks also held significant numbers of swans (Table 1). The 2008 winter count was a 7.8% increase from that of 2007 and was the highest winter count recorded (Appendix A). The trumpeter swan count increased ~49% between the fall 2008 (429 swans) and winter 2008 (639 swans) surveys (Appendix B; Comeau and Vrtiska 2008). We observed no swans on Lacreek NWR during the 2008 winter survey. In addition to High Plains trumpeter swans, 30 other swans were observed during the 2008 winter survey on the Loup River (Table 2). Given their more southeasterly occurrence, it is likely that these birds are from restoration efforts in other states to the east (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. 3). Trends in cygnets counted in fall and winter surveys suggest little increase over time; however, a spike in the count of cygnets occurred in both the 2008 fall and winter surveys (Fig. 3). Counts of cygnets from both surveys appear to

track each other closely, exhibiting similar peaks and valleys of abundance (Fig. 3). However, the ratio of cygnets to white birds in winter counts indicates a steady decline since 1976 (Fig. 4).

Table 1. Areas surveyed and the number of trumpeter swans considered as part of the High Plains flock observed during the 2008 winter trumpeter swan survey in Nebraska.

	Number of Birds Surveyed		
Area Surveyed	**White Birds**	**Cygnets**	**Total**
North Platte River			
Lake Ogallala-Keystone	22	2	24
Lewellen-Clear Creek Refuge	1	0	1
Keystone-Paxton	17	1	18
North Loup River			
Purdum – Brewster	2	0	2
End of River-Purdum	86	19	105
Middle Loup River			
Mullen – Seneca	19	1	20
North of Whitman-Mullen	4	5	9
Seneca – Halsey	18	0	18
Other Areas			
Birdwood Creek	45	10	55
Blue Creek	26	7	33
3m West of HWY 61 - Merritt Reservoir	107	31	138
Calamus River (Burwell - HWY 183)	22	3	25
Calamus River (HWY 183 - HWY 7)	11	2	13
Merrit Reservoir: Boardman Arm / Snake River Arm	151	27	178
Totals	**531**	**108**	**639**

Table 2. Location and numbers of other trumpeter swans observed during the 2008 Mid-Winter Survey that are not considered part of the High Plains flock.

	Number of Birds Surveyed		
Area Surveyed	**White Birds**	**Cygnets**	**Total**
Loup River			
Genoa-Mouth	25	5	30

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 inhabit 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.

Drought conditions seemingly subsided during fall/winter 2008, with only the far western portion of Nebraska classified as abnormally dry (Fig. 2). Below-average temperatures and quality water conditions resulted in swans dispersing less, and instead concentrated birds on open water areas such as reservoirs and spring-fed creeks and rivers. These conditions may account for the increase in the number of birds observed during the 2008 winter survey. Separate counts of adult swans and cygnets were made in all areas during the 2008 winter survey. It appears that counts of white birds in both fall and winter surveys continue to increase, while the cygnet production rate (i.e., cygnets/white birds) appears to be steadily declining over time, although a slight increase occurred in 2008 (Fig.3). 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 better understand the ecology of these birds. Ensuring separate counts for adults and cygnets will assist in determining production in the future.

Acknowledgements

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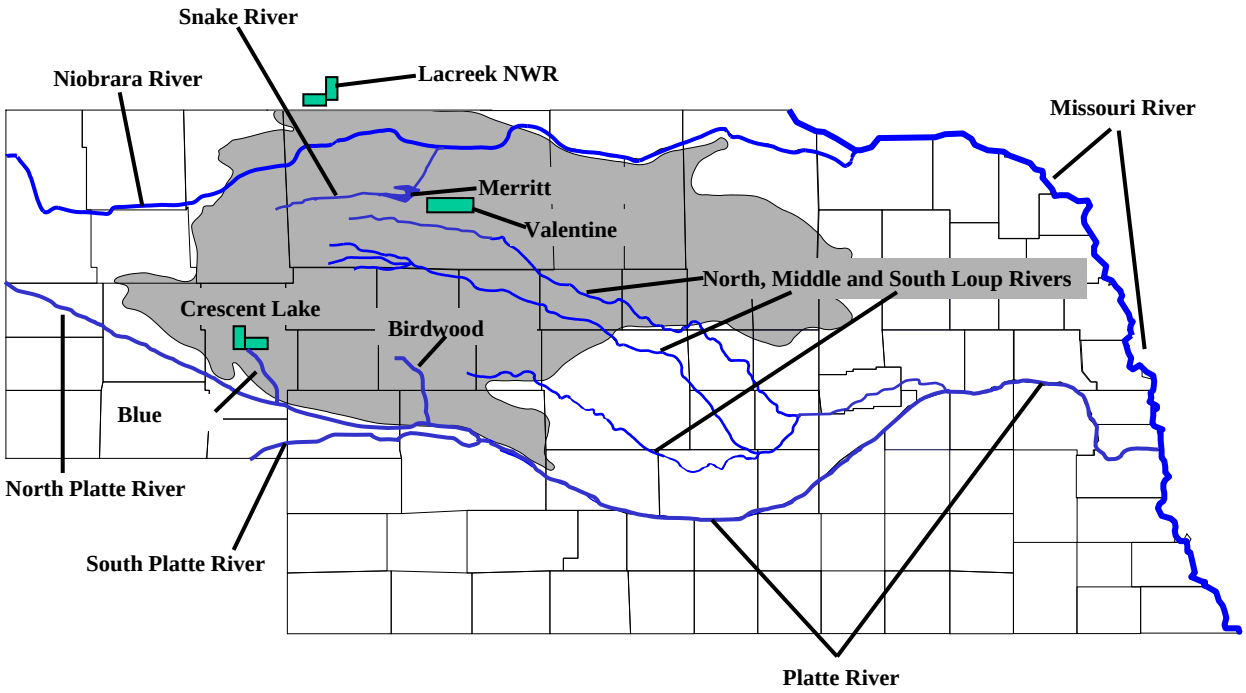

Figure 1. Location of the Sandhills of Nebraska (shaded portion), Lacreek National Wildlife Refuge,

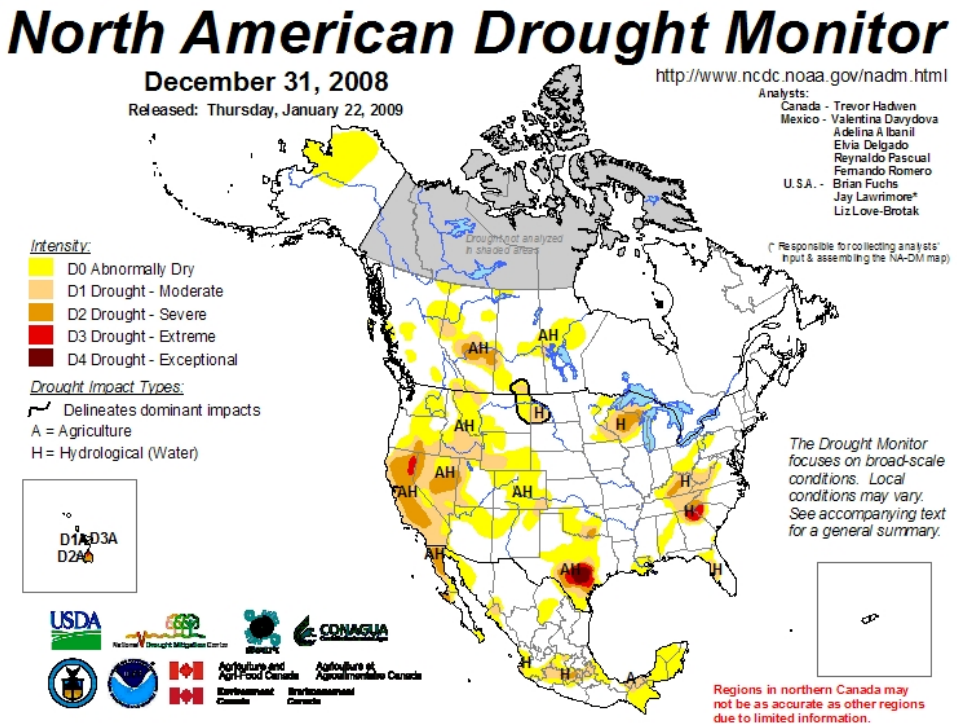

Figure 2. NOAA map of drought conditions the week of the survey.

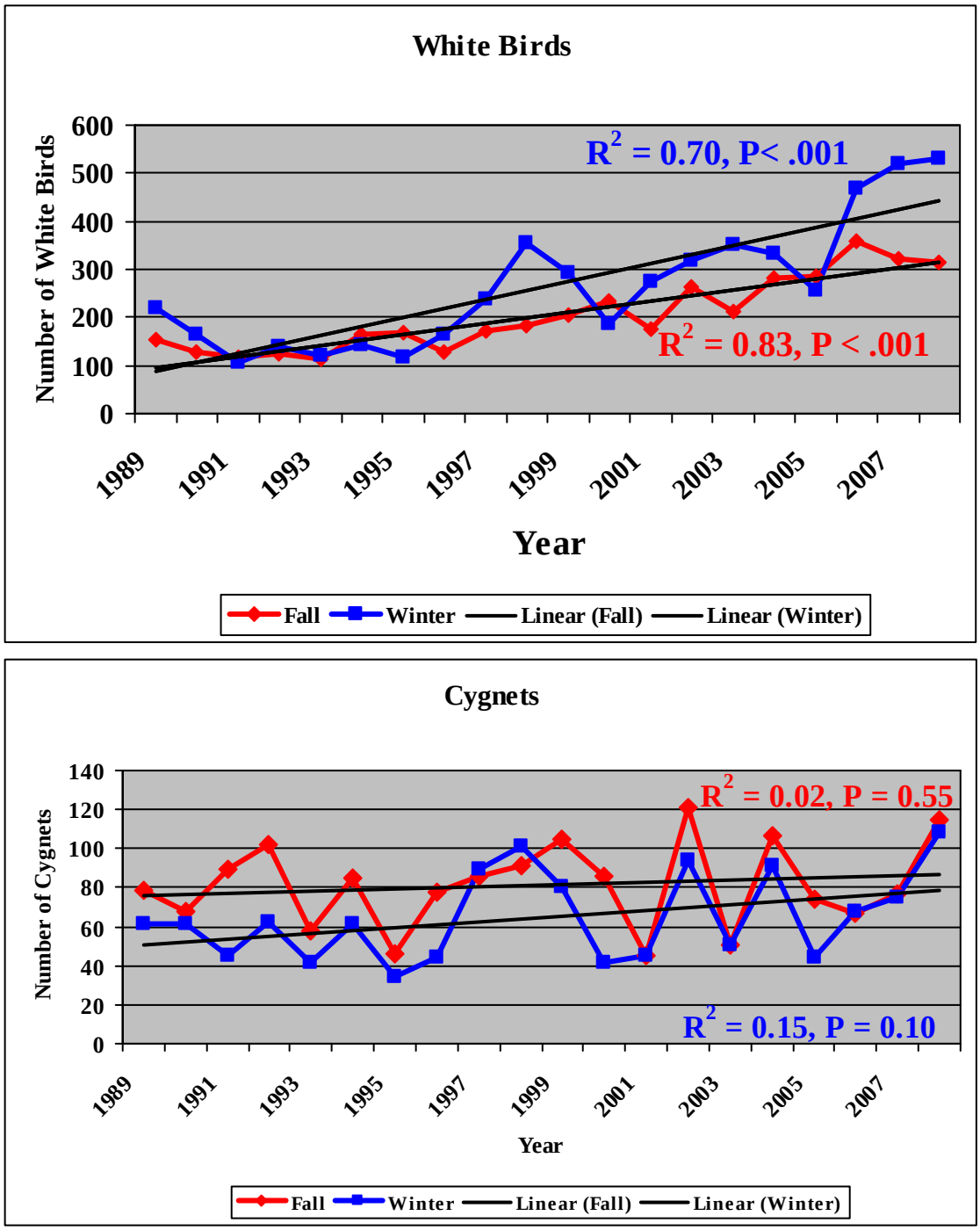

Figure 3. Trends of adults and cygnets in fall and winter counts, High Plains flock, 1989-2008.

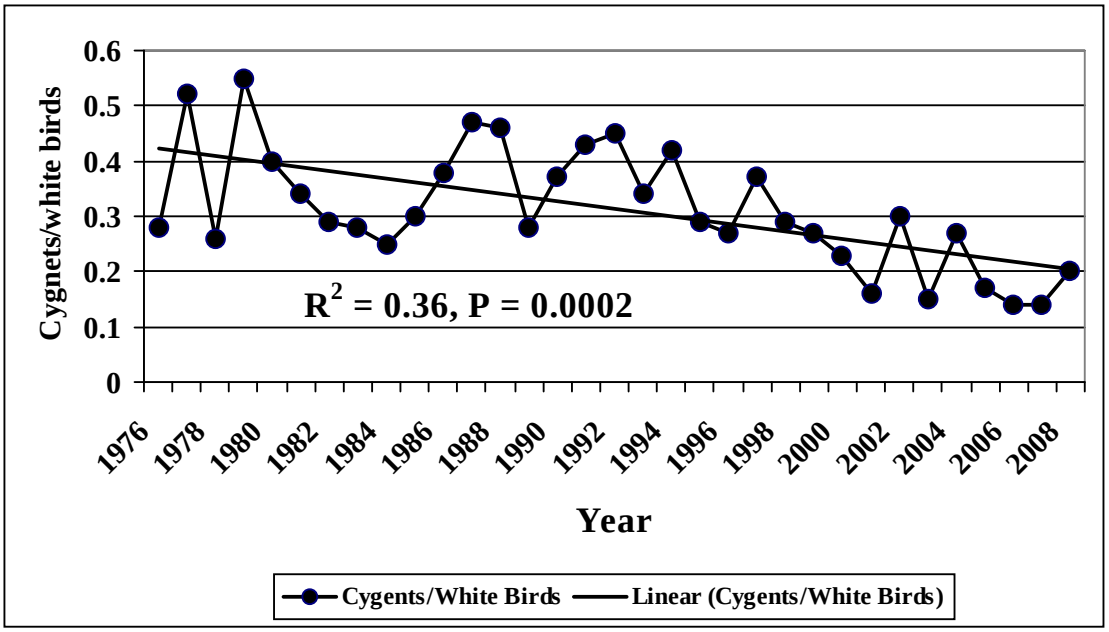

Figure 3. Ratio of cygnets/white birds from winter counts, High Plains flock, 1976-2008. Birds observed during 2005 survey were not fully categorized into cygnets and white birds for entire survey area.

Appendix A.

High Plains flock trumpeter swan Fall and Mid-Winter Survey results, 1967-2008.

	Fall Survey			Winter Survey		
Year[a]	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
2005/2006	284	74	358	255[d]	44[d]	454

2006/2007	360	67	427	470	68	538
2007/2008	321	77	398	518	75	593
2008/2009	314	115	429	531	108	639

[a]Fall survey/Winter survey.
[b]Counts not divided into white birds and cygnets.
[c]Blanks denote survey was not conducted or counts were not available.
[d]Counts were not fully categorized as either adult or cygnets.

Appendix B. Differences in fall and winter counts of High Plains flock of trumpeter swans, 1980-2008.

			Difference	
Year[a]	Fall	Winter	*n*	%
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	44
2002	385	412	27	7
2003	264	401	137	52
2004	389	423	34	9
2005	358	454	96	27
2006	427	538	111	21
2007	398	593	195	49
2008	429	639	210	49

[a]Winter counts were matched to nearest fall count (e.g., 2004 row is for the 2004 Fall Survey and the 2005 Mid-winter Survey).
[b]Blanks denote survey was not conducted or counts were not available.