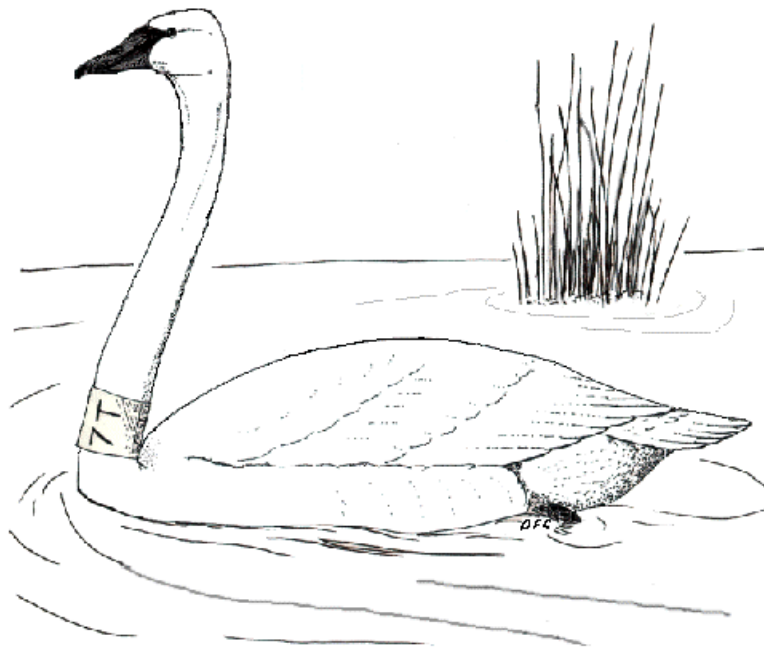


U.S. Fish and Wildlife Service

Trumpeter Swan

Population Status, 2000



TRUMPETER SWAN POPULATION STATUS, 2000

February 2001

Compiled by David F. Caithamer
Division of Migratory Bird Management
U.S. Fish and Wildlife Service
11500 American Holly Drive
Laurel, MD 20708-4016
USA

Abstract

The sizes of the three populations of trumpeter swans (*Cygnus buccinator*) in North America were assessed in 2000. Methods for the survey were similar to those of previous surveys, which generally occurred at 5 year intervals beginning in 1968. Collectively, a total of 23,647 swans were counted, which is about 3,900 (20%) more than in 1995 and 20,000 (535%) more than in 1968. Each of the three populations grew to record high levels in 2000. The Pacific Coast Population (PCP) remains numerically largest at 17,551, which is 8% higher than its 1995 estimate. The Rocky Mountain Population (RMP) increased 46% since 1995 to 3,666 swans. The Interior Population (IP) increased more than 150% since 1995 and now numbers 2,430 individuals.

Introduction and Methods

This report summarizes results of a trumpeter swan survey that was conducted during 2000 across their entire range in North America. The last comparable survey was conducted in 1995. Similar surveys also were conducted in 1968, 1975, and then every 5 years. This report compares findings from 2000 to those of previous quinquennial surveys (U.S. Fish and Wildlife Service et al. 1994, Caithamer 1996). The purpose of this survey is to provide assessments of the status of the Pacific Coast, Rocky Mountain, and Interior populations of trumpeter swans in North America.

The 2000 survey was a coordinated effort of numerous agencies and persons. Most areas were surveyed aerially or by a network of ground observers. Surveys were believed to be complete censuses except for northern British Columbia and the Yukon Territory, where population estimates were based on random samples across the suspected range of trumpeter swans. Some information, such as number of single, paired, and flocked swans, was not gathered at all areas. No efforts were directed at surveying captive swans. The median starting and ending date for surveys were 20 August and 11 September, respectively. However, surveys began as early as 15 April 2000 and ended as late as 25 January 2001. All population estimates were treated as though they were measured without error.

Results and Discussion

The late-summer ranges of each population of swans changed since 1995. New occurrences were noted in New York and Ohio, and at new areas in Alberta, British

Columbia, Iowa, Michigan, Minnesota, Ontario, Wisconsin, and elsewhere. However, swans were no longer observed at specific sites in northern California, Washington, and southwestern Saskatchewan where they previously occurred.

A total of 23,647 trumpeter swans were present in late-summer 2000 (Table 1, Appendix A). The total population increased by about 3,900 birds (20%) since 1995 and 20,000 birds (>500%) since 1968 (Table 2). Each population increased since 1995 to record-highs this year (Figure 2). The PCP increased by about 1,200 (8%) since 1995 and remained numerically larger than the RMP and IP combined. Since 1995, the RMP increased by about 1,100 birds (46%) while the IP increased by about 1,500 birds (>150%).

Growth in the PCP was due to an increase in Alaska. In the Yukon Territory and British Columbia, the flock size in 2000 (396, 95% confidence range = 348-444) was similar to its size in 1995 (490, 95% confidence range = 197-783).

Growth in the RMP since 1995 was due to increased numbers of swans in the Interior Canada and Tri-State flocks. A small portion ($\leq 5\%$) of the increase in the Interior Canada flock was possibly due to expanded survey coverage of northern Alberta in 2000 (G. Beyersbergen, Canadian Wildlife Service, personal communication). The number of swans in restoration areas decreased slightly since 1995; decreases were observed in both the number of cygnets and adults. Annual surveys (Reed 2000) indicate that size of the Tri-State and Restoration flocks were relatively stable during 1983-1991, and that they decreased by about 125 swans in 1993. Since 1994, the combined size of the Tri-State and Restoration flocks have increased slightly (6%) (Reed 2000). In Oregon, some swans may have dispersed into unsurveyed areas and thus the current estimate may be biased low (B. Bales, Oregon Department of Fish and Wildlife, personal communication).

Across the range of the IP, swan numbers continued to increase. Some of these increases are the result of continuing intensive efforts to reintroduce swans into historic parts of their range (J. Johnson, Michigan State University, personal communication).

Cygnets comprised 19% of the PCP, which is lower than 5 of the 6 previous surveys (Table 3). In the RMP, cygnets accounted for 30% of all swans, which was higher than in 5 of the 6 previous surveys. Cygnets also accounted for 30% of the swans in the IP, which was typical of other years.

Brood sizes averaged 2.8-3.6 in the 3 populations (Table 1). Brood sizes in Alaska averaged less (difference between means = -0.4) in 2000 than in 1995; this is consistent with the smaller proportion of cygnets observed in Alaska in 2000 (Conant et al. 2001). Average brood size in the IP was greater (difference between means = +0.7) than in 1995, and accounts for the higher proportion of young observed in 2000. In the RMP, brood size information was generally not collected for the Tri-State and Restoration Area flocks in 2000. Thus, it was impossible to compare brood sizes from these two flock to those from other years.

The proportion of paired birds was lower in the IP and Restoration Flocks of the RMP than in the Alaska and Interior Canada flocks (Table 4). The lower proportion of pairs may be related to recent and ongoing population restoration programs in these areas (Caithamer 1996).

Literature Cited

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Acknowledgements

The data were collected by >140 individuals working for various agencies (Appendix B), and others who reported incidental observations. Any omissions from this list is accidental and I offer my apology. R. Andrews, B. Bales, G. Beyersbergen, B. Bortner, K. Bousquet, A. Breault, B. Conant, J. Cornely, D. Groves, C. Harris, J. Hawkings, J. Johnson, S. Kittelson, R. Kraft, H. Lumsden, S. Matteson, M. Norton, T. Reed, D. Sherman, M. St. Louis, and B. Swift coordinated regional surveys and/or summarized regional data. G. Beyersbergen, B. Conant, J. Cornely, D. Groves, J. Johnson, G. Smith, and R. Trost provided helpful comments on early drafts of this report. M. Otto provided statistical advice and assisted analyzing data from northern British Columbia and the Yukon Territory. Financial support for surveys in Ontario were provided by Lake Erie Steel Company, Paletta International Corporation, and Mrs. Allison's Cookies.

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Table 1. Demographics of Pacific Coast, Rocky Mountain, and Interior populations of trumpeter swans in late-summer, 2000.

Population	Flock	Total Swans	White Swans ¹	Cygnet	% Cygnets	Broods	Brood Size	
							\bar{x} ²	SD ³
Pacific Coast	Alaska	17,155	13,934	3,221	19	1,149	2.8	1.4
	Yukon and Northwestern							
	British Columbia	396	291	106	27	28	3.5	1.4
	Pacific Coast Total	17,551	14,225	3,327	19	1,177	2.8	1.4
Rocky Mountain	Interior Canada	3,184	2,175	1,009	32	329	3.1	1.9
	Tri-State	426	324	102	24			
	Restoration Areas	56	49	7	13			
	Rocky Mountain Total	3,666	2,548	1,118	30		3.1	1.9
Interior	High Plains	370	267	103	28	32	3.2	1.4
	Mississippi and Atlantic							
	Flyways	2,060	1,443	617	30		3.6	2.1
	Interior Total	2,430	1,710	720	30		3.6	2.0
North American								
Total		23,647	18,483	5,165	22		3.0	1.5

¹Adult and sub-adult swans.

²Weighted average based on number of broods observed in each survey area.

³Weighted average of standard deviations based on number of broods observed in each survey area.

Table 2. Sizes of trumpeter swan populations, 1968-2000.¹

Population	Flock	1968	1975	1980	1985	1990	1995	2000
Pacific Coast	Alaska	2,847	4,170	7,696	9,459	13,337	15,823	17,155
	Yukon and Northwestern							
	British Columbia				45	119	489	396
	Pacific Coast Total	2,847	4,170	7,696	9,504	13,456	16,312	17,551
Rocky Mountain	Interior Canada ²	106	131	379	614	1,117	2,076	3,184
	Tri-State ²	585	537	485	507	589	364	426
	Restoration Areas	120	131	111	74	41	77	56
	Rocky Mountain Total ²	811	799	975	1,195	1,747	2,517	3,666
Interior	High Plains	64	116	164	158	185	240	370
	Mississippi and Atlantic							
	Flyways	0	0	12	51	237	687	2,060
	Interior Total	64	116	176	209	422	927	2,430
North American Total		3,722	5,085	8,847	10,908	15,625	19,756	23,647

¹Estimates for 1968-1990 were sums of estimates reported for individual areas in Appendices 1, 2, and 3 of U.S. Fish and Wildlife Service et al. (1994); estimates from 1995 were from Caithamer (1996).

²Estimates reported in 1975 were obtained in 1974 or 1975.

Table 3. Percentage of trumpeter swans that were cygnets, 1968-2000.¹

Population	Flock	1968	1975	1980	1985	1990	1995	2000
Pacific Coast	Alaska	32	28	32	18	27	24	19
	Yukon and Northwestern							
	British Columbia				13	37	39	27
	Pacific Coast Total	32	28	32	18	27	25	19
Rocky Mountain	Interior Canada ²	29	33	27	30	32	30	32
	Tri-State ²	26	15	5	27	25	15	24
	Restoration Areas	18	18	31	8	27	14	13
	Rocky Mountain Total ²	25	18	16	28	30	28	30
Interior	High Plains	33	30	27	40	34	21	28
	Mississippi and Atlantic							
	Flyways			0	14	27	26	30
	Interior Total	33	30	25	33	30	25	30
North American								
Total		31	27	30	19	27	25	22

¹Estimates for 1968-1990 were from estimates reported for individual areas in Appendices 1, 2, and 3 of U.S. Fish and Wildlife Service et al. (1994); estimates from 1995 were from Caithamer (1996).

²Estimates reported in 1975 were obtained in 1974 or 1975.

Table 4. Social status of white (adult and sub-adult) trumpeter swans observed in late-summer, 2000.

Population	Flock	% Paired	% Single	% Flocked	n
Pacific Coast	Alaska	72	6	22	13,934
	Yukon and Northwestern British Columbia				
	Pacific Coast Total	72	6	22	
Rocky Mountain	Interior Canada	69	6	26	1,118
	Tri-State				
	Restoration Areas	46	31	23	13
	Rocky Mountain Total	69	6	26	1,131
Interior	High Plains	49	4	48	267
	Mississippi and Atlantic Flyways	37	6	57	338
	Interior Total	42	5	53	605
	North American Total	70	6	23	15,670



Fig. 1. Approximate ranges of Pacific Coast, Rocky Mountain, and Interior populations of trumpeter swans during late-summer of 2000.

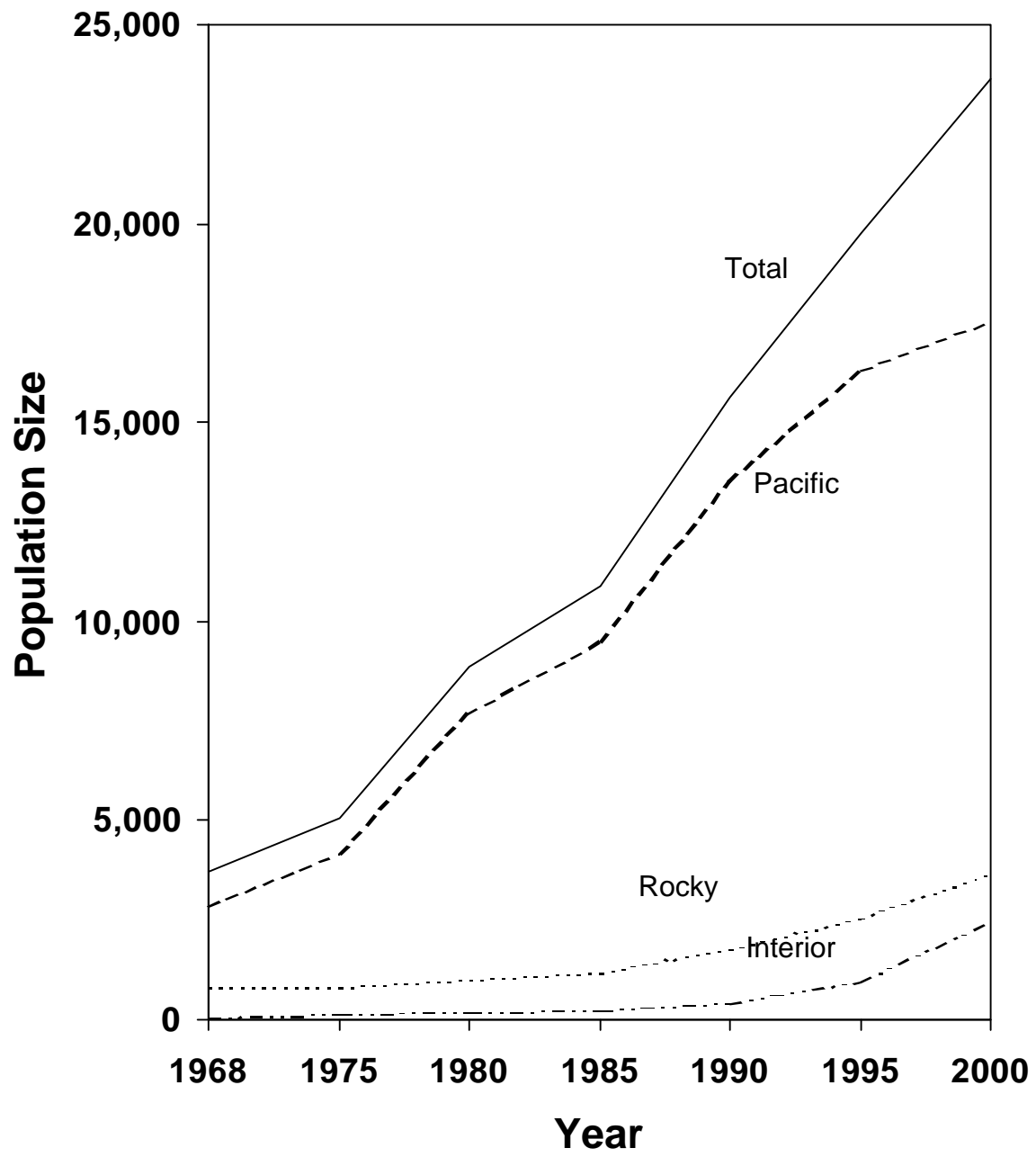


Fig. 2. Trends in sizes of the Pacific Coast, Rocky Mountain, Interior, and total populations of trumpeter swans in North America, 1968-2000.

Appendix A. Raw data from the trumpeter swan survey, 2000.

Population	Flock	Region	State	Start	End	Method ¹	Coverage ²	Adults	Cygnets	Total Swans	Fledged Adults	Flocks
PACIFIC	PACIFIC	AK	AK	24-Jul-00	9-Sep-00	1	1	13934	3221	17155	3049	530
PACIFIC	PACIFIC	YKNBC	YKBC	1-Aug-00	24-Aug-00	1	2	291	106	396	95	
ROCKY	INTCAN	YKNBC	YKBC	1-Aug-00	24-Aug-00	1	2	1057	469	1526	369	
ROCKY	INTCAN	NEBC	BC	13-Aug-00	18-Sep-00	1	1	244	119	363	41	10
ROCKY	INTCAN	SEBC	BC	13-Aug-00	13-Aug-00	2	1	2	4	6	0	0
ROCKY	INTCAN	MCK	MCK	21-Aug-00	24-Aug-00	1	1	204	90	294	33	8
ROCKY	INTCAN	AB	AB	7-Aug-00	14-Sep-00	5	1	668	327	995	212	21
ROCKY	INTCAN	SK	SK	24-Jul-00	24-Jul-00	2	1	0	0	0	0	0
ROCKY	TRISTATE	MT	MT	13-Sep-00	20-Sep-00	1	1	127	24	151		
ROCKY	TRISTATE	WY	WY	13-Sep-00	24-Sep-00	5	1	95	38	133		
ROCKY	TRISTATE	IDFEDER	ID	15-Sep-00	20-Sep-00	5	1	102	40	142		
ROCKY	TRISTATE	IDSTATE	ID	15-Apr-00	1-Sep-00	2	1	0	0	0	0	0
ROCKY	RESTOR	COLUMBIA	WA	15-May-00	15-May-00	1	1	0	0	0	0	0
ROCKY	RESTOR	TURNBULL	WA	15-Aug-00	15-Aug-00	2	1	1	0	1	0	0
ROCKY	RESTOR	RUBY	NV	15-Sep-00	15-Sep-00	1	1	26	2	28		
ROCKY	RESTOR	MALHEUR	OR	18-Sep-00	18-Sep-00	2	1	10	5	15		
ROCKY	RESTOR	SUMMER	OR	21-Sep-00	21-Sep-00	5	1	3	0	3	3	1
ROCKY	RESTOR	OTHEROR	OR	21-Sep-00	21-Sep-00	5	1	9	0	9	0	0
ROCKY	RESTOR	LKLAMCA	CA	15-Aug-00	15-Aug-00	2	1	0	0	0	0	0
INTERIOR	HIPLAINS	SD	SD	20-Aug-00	8-Sep-00	1	1	33	20	53	13	3
INTERIOR	HIPLAINS	NE	NE	20-Aug-00	8-Sep-00	1	1	200	66	266	105	15
INTERIOR	HIPLAINS	WY	WY	20-Aug-00	8-Sep-00	1	1	2	0	2	0	0
INTERIOR	HIPLAINS	SKMAN	SKMAN	28-Aug-00	18-Sep-00	1	1	32	17	49	9	1
INTERIOR	MISATFLY	ON	ON	1-Sep-00	30-Sep-00	5	1	277	48	325		
INTERIOR	MISATFLY	MN	MN	1-May-00	25-Jan-01	5	1	612	302	914		
INTERIOR	MISATFLY	WI	WI	1-Jun-00	30-Sep-00	5	1	86	114	200		
INTERIOR	MISATFLY	MI	MI	1-Sep-00	30-Nov-00	2	1	274	127	401	169	20
INTERIOR	MISATFLY	IA	IA	1-Sep-00	15-Oct-00	2	1	130	6	136		
INTERIOR	MISATFLY	OH	OH	29-Aug-00	29-Aug-00	5	1	51	13	64	17	4
INTERIOR	MISATFLY	NY	NY	1-Jun-00	31-Aug-00	2	1	13	7	20	7	1

Appendix A. Concluded.

Population	Flock	Region	State	Pairs W Cygnet	Pairs W/O Cygnet	Pairs Total	Singles W/O Cygnet	Singles W Cygnet	Broods	Mean Brood Size	SE Brood Size	N Brood Size ³
PACIFIC	PACIFIC	AK	AK	1119	3874	4993	869	30	1149	2.80	0.04	1149
PACIFIC	PACIFIC	YKNBC	YKBC			88	20		28	3.49	0.23	37
ROCKY	INTCAN	YKNBC	YKBC			316	55		163	2.88	0.20	48
ROCKY	INTCAN	NEBC	BC	35	59	94	15	0	35	3.40	0.95	35
ROCKY	INTCAN	SEBC	BC	1	0	1	0	0	1	4.00		1
ROCKY	INTCAN	MCK	MCK	31	47	78	14	1	32	2.81	0.25	32
ROCKY	INTCAN	AB	AB	96	116	212	30	2	98	3.37	0.17	98
ROCKY	INTCAN	SK	SK	0	0	0	0	0	0			0
ROCKY	TRISTATE	MT	MT									
ROCKY	TRISTATE	WY	WY									
ROCKY	TRISTATE	IDFEDER	ID									
ROCKY	TRISTATE	IDSTATE	ID	0	0	0	0	0	0			0
ROCKY	RESTOR	COLUMBIA	WA	0	0	0	0	0	0			0
ROCKY	RESTOR	TURNBULL	WA	0	0	0	1	0	0			0
ROCKY	RESTOR	RUBY	NV									
ROCKY	RESTOR	MALHEUR	OR									
ROCKY	RESTOR	SUMMER	OR	0	0	0	0	0	0			0
ROCKY	RESTOR	OTHEROR	OR	0	3	3	3	0	0			0
ROCKY	RESTOR	LKLAMCA	CA	0	0	0	0	0	0			0
INTERIOR	HIPLAINS	SD	SD	4	5	9	2	0	4	5.00	0.71	4
INTERIOR	HIPLAINS	NE	NE	24	22	46	3	0	24	2.75	0.28	24
INTERIOR	HIPLAINS	WY	WY	0	0	0	2	0	0			0
INTERIOR	HIPLAINS	SKMAN	SKMAN	4	6	10	3	0	4	4.25	0.63	4
INTERIOR	MISATFLY	ON	ON	16	6	22	0	0	16	3.00	0.52	16
INTERIOR	MISATFLY	MN	MN						77	3.92	0.44	28
INTERIOR	MISATFLY	WI	WI	31	12	43			31	3.68	0.37	31
INTERIOR	MISATFLY	MI	MI	39	11	50	5	0	39	3.26	0.29	39
INTERIOR	MISATFLY	IA	IA	2	15	17	25	0	2	3.00	2.00	2
INTERIOR	MISATFLY	OH	OH	5	5	10	14	0	5	2.70	0.66	5
INTERIOR	MISATFLY	NY	NY	1	2	3	0	0	1	7.00		1

¹Survey method (1= aerial, 2=ground, 3=other, 5=combination of methods).

²Extent of survey coverage (1=believed complete census, 2=sample of entire range, 3=census of part of range).

³Number of broods observed to estimate mean brood size.

Appendix B. Participants in the 2000 survey of trumpeter swans.

Akaran, J.	U.S. Fish and Wildlife Service
Akola, E.	U.S. Fish and Wildlife Service
Anderson, E.	Alberta Environment
Andrews, R.	Iowa Department of Natural Resources
Arment, R.	Research Air
Arner, B.	Ducks Unlimited Canada
Artmann, M.	U.S. Fish and Wildlife Service
Bales, B.	Oregon Department of Fish and Wildlife
Barber, J.	Ohio Division of Wildlife
Bartos, A.	Wisconsin Department of Natural Resources
Bertram, M.	U.S. Fish and Wildlife Service
Beveridge, E.	Saskatchewan Environment and Resource Management
Beyersbergen, G.	Canadian Wildlife Service
Bortner, B.	U.S. Fish and Wildlife Service
Bouffard, S.	U.S. Fish and Wildlife Service
Bousquet, K.	U.S. Fish and Wildlife Service
Breault, A.	Canadian Wildlife Service
Bryant, J.	U.S. Fish and Wildlife Service
Burns, E.	U.S. Fish and Wildlife Service
Calverly, B.	Ducks Unlimited Canada
Catterson, N.	U.S. Fish and Wildlife Service
Colvert, I.	U.S. Fish and Wildlife Service
Conant, B.	U.S. Fish and Wildlife Service
Cornely, J.	U.S. Fish and Wildlife Service
Crawford, D.	Minnesota Department of Natural Resources
Dau, C.	U.S. Fish and Wildlife Service
Denison, D.	Coyote Air Service
Duncan, D.	Canadian Wildlife Service
Eldridge, B.	U.S. Fish and Wildlife Service
Erkins, R.	Idaho Department of Fish and Game
Fetting, A.	Wisconsin Department of Natural Resources
Ficht, J.	Alberta Environment
Fischer, J.	U.S. Fish and Wildlife Service
Foote, L.	Ducks Unlimited Canada
Found, C.	Alberta Environment
Freese, L.	Parks Canada
Froggatt, J.	U.S. Fish and Wildlife Service
Gilbert, D.	U.S. Fish and Wildlife Service
Gorecki, L.	Parks Canada
Groves, D.	U.S. Fish and Wildlife Service
Guldager, N.	U.S. Fish and Wildlife Service (volunteer)
Halverson, L.	Parks Canada
Hamilton, S.	
Hans, M.	U.S. Fish and Wildlife Service
Harris, C.	Idaho Department of Fish and Game
Hawkings, J.	Canadian Wildlife Service
Hawkings, J.	Canadian Wildlife Service
Heckbert, M.	Alberta Environment
Henry, D.	Parks Canada
Hernandez, H.	U.S. Fish and Wildlife Service

Appendix B. Continued.

Heuer, T.	U.S. Fish and Wildlife Service
Hill, R.	U.S. Fish and Wildlife Service
Hobson, D.	Alberta Environment
Hodges, J.	U.S. Fish and Wildlife Service
Hodges, M.	U.S. Fish and Wildlife Service (volunteer)
Hoffman, D.	Iowa Department of Natural Resources
Hudolin, M.	Wye Marsh Center
Hughes, G.	U.S. Fish and Wildlife Service
Huhndorf, J.	U.S. Fish and Wildlife Service
Johnson, J.	Kellogg Bird Sanctuary
Jones, B.	Manitoba Natural Resources
Jozwiak, E.	U.S. Fish and Wildlife Service
Kampshoff, M.	U.S. Forest Service
Kaye, R.	Parks Canada
King, J.	U.S. Fish and Wildlife Service
King, R.	U.S. Fish and Wildlife Service
Kingdon, B.	Private
Kirtley-Wark, M.	Alberta Environment
Kittelson, S.	Minnesota Department of Natural Resources
Kraft, R.	U.S. Fish and Wildlife Service
Kujat, C.	Alberta Environment
Kunnas, F.	Alberta Environment
Larned, A.	U.S. Fish and Wildlife Service
Larned, B.	U.S. Fish and Wildlife Service
Larned, S.	U.S. Fish and Wildlife Service (volunteer)
Larson, K.	U.S. Fish and Wildlife Service
Latour, P.	Canadian Wildlife Service
Lawrence, S.	Private
Laws, M.	U.S. Fish and Wildlife Service
Linck, M.	Hennepin Parks and The Trumpeter Swan Society
Lucey, B.	U.S. Forest Service
Lumsden, H.	Ontario Ministry of Natural Resources, retired
Lust, G.	Mountain Air Research
Mackay, J.	U.S. Fish and Wildlife Service
Mallek, E.	U.S. Fish and Wildlife Service
Manthey, P.	Wisconsin Department of Natural Resources
Matteson, S.	Wisconsin Department of Natural Resources
Mauser, D.	U.S. Fish and Wildlife Service
Maxwell, M.	U.S. Fish and Wildlife Service
McCormick, K.	Canadian Wildlife Service
McEaney, T.	U.S. National Park Service
Merilies, B.	
Morris, R.	Idaho Department of Fish and Game
Morse, J.	U.S. Geological Survey
Moyles, D.	Alberta Environment
Nelson, S.	U.S. Fish and Wildlife Service
Norstrom, W.	Alberta Environment
Norton, M.	Canadian Wildlife Service
Olson, D.	U.S. Fish and Wildlife Service
Orcutt, D.	Idaho Department of Fish and Game

Appendix B. Concluded.

Palmer, B.	Idaho Department of Fish and Game
Patla, S.	Wyoming Fish and Game
Payne, T.	U.S. Army
Petersen, P.	U.S. Fish and Wildlife Service
Peterson, J.	ABR, Incorporated
Pollard, B.	Ducks Unlimited Canada
Pryor, P.	Canadian Wildlife Service
Quinlan, R.	Alberta Environment
Reed, T.	U.S. Fish and Wildlife Service
Ritchie, B.	ABR, Incorporated
Roberts, J.	U.S. Fish and Wildlife Service
Roetker, F.	U.S. Fish and Wildlife Service
Rule, M.	U.S. Fish and Wildlife Service
Sarvis, J.	U.S. Fish and Wildlife Service
Schwalen, N.	U.S. Fish and Wildlife Service
Shaw, R.	U.S. Fish and Wildlife Service
Shea, R.	The Trumpeter Swan Society
Sherman, D.	Ohio Division of Wildlife
Simpson, F.	Ducks Unlimited Canada
Skjonsberg, T.	Parks Canada
Smith, T.	Manitoba Natural Resources
Smoke, B.	U.S. Fish and Wildlife Service
Spernak Airways	
Spindler, M.	U.S. Fish and Wildlife Service
St. Louis, M.	Oregon Department of Fish and Wildlife
Staley, R.	Parks Canada
Stradley, R.	U.S. National Park Service
Strassburg, W.	U.S. Fish and Wildlife Service
Swift, B.	New York Division of Fish, Wildlife, and Marine Resources
Tabor, J.	Washington Department of Fish and Wildlife
Tak, P.	U.S. Fish and Wildlife Service
Thomas, G.	U.S. Fish and Wildlife Service
Trenholm, M.	Minnesota Department of Natural Resources
Twist, B.	Western Montana Aviation
Vivion, M.	U.S. Fish and Wildlife Service
Ward, D.	U.S. Geological Survey
Watt, R.	Waterton Lakes National Park
Webb, D.	U.S. Fish and Wildlife Service
Whitney, D.	Private
Whitworth, K.	U.S. Fish and Wildlife Service
Williams, G.	U.S. Fish and Wildlife Service
Wooten, G.	Idaho Department of Fish and Game
Wright, K.	Alberta Conservation Association
