

TRUMPETER SWAN SURVEYS
ON THE
CHUGACH NATIONAL FOREST
1997

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April 1998

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ABSTRACT

Trumpeter swan (*Cygnus buccinator*) aerial surveys were conducted during May and August 1997 on the Copper River Delta and surrounding areas of the Chugach National Forest in southcentral Alaska. The surveys were accomplished through cooperation between the U.S. Fish and Wildlife Service and the U.S. Forest Service. In May 517 white (adult and subadult) swans and 117 nests were counted. In August 598 white swans and 54 broods were counted. Production was average. Nest success was 0.46, average brood size was 3.2, and young made up 23% of the early fall population. The fall white swan population was down 5% from 1996 and was 7% below the 22-year average. There are now 41 comparable swan surveys in 22 different years for this area. A continued standardized trumpeter swan survey program is recommended.

INTRODUCTION

The Copper River Delta and surrounding coastal wetlands in the Chugach National Forest support a large and dense nesting and summering population of trumpeter swans (*Cygnus buccinator*). Aerial surveys were conducted in this area as part of U.S. Fish and Wildlife Service (USFWS) statewide trumpeter censuses in 1968, 1975, 1980, 1985, 1990, and 1995 (Hansen et al. 1971, King 1976, King and Conant 1981, Conant et al. 1985, Conant et al. 1991, Conant et al. 1996). The U.S. Forest Service (USFS) initiated aerial surveys in 1978, and annual swan surveys have been jointly accomplished under a formal agreement between the USFWS and USFS since 1981.

STUDY AREA

The study area was comprised of portions of the Copper River Delta and Controller Bay drainages within 1:63,360 scale topographic maps (Figure 1). The area actually surveyed consisted of 1787 km² (690 mi²) of potential swan nesting and summering habitat delineated on these maps. In general, potential swan habitat included most lakes, rivers, streams and all wetland areas under 760 m (2500 ft.) elevation.

METHODS

Aerial surveys were conducted 26-27 May 1997 with a Cessna 185 (N1055F) and on 14-17 August 1997 with the USFWS Turbo-Beaver (N754). The aerial survey method used for both surveys was described by King (1973). Generally, a system of parallel tracks was flown over all known and suspected habitat within each quadrangle map at an altitude of 150-180 m (500-600 ft.) above ground. The pilot was responsible

for navigation, making swan observations, and ensuring that all swan habitat was adequately surveyed, considering factors such as visibility and the observer's level of training. The front seat observer was responsible for recording the flight path, making swan observations, and recording the type and exact location of each observation on 1:63,360 scale maps. During five previous USFS surveys in which chartered aircraft were used, all of these duties were assumed by the observers. Back seat observers were used, when available, to increase the eye power from the aircraft.

Swan observations were entered directly from field maps into a portable Compaq LTE/286 computer. These data were then merged with exact latitude and longitude coordinates for each observation from field maps via an Altek digitizing system. The final data files formed the framework from which statistical summaries were produced.

RESULTS

Population Trend

In May 1997, 517 white swans (adults and subadults) were counted, down 13% from spring 1996 and 16% below the 19-year average (Table 1). The number of single and paired birds in spring decreased 8% from last year and was similar (-2%) to the average (Table 1). The number of flocked birds decreased 33% from 1996 and was 51% below the average (Table 1).

In August 1997, 598 white swans were counted, down 5% from August 1996 and 7% below the 22-year average (Table 2, Figure 2). The number of single and paired birds decreased 3% from last year and was nearly identical (+1%) to the average (Table 2). The number of flocked birds decreased 11% from 1996 and was 24% below the average (Table 2).

Productivity

The proportion of pairs with nests in late May was 0.55, up 15% from 1996 and similar (+2%) to the 19-year average. One hundred seventeen nests observed in May produced 54 broods still present in August, resulting in a nest success of 0.46 (Table 3, Figure 3). Nest success increased 21% from 1996 and was similar (-2%) to the 19-year average (Table 3). Pairs nesting on the western portion of the Copper River Delta experienced much greater nest success than those nesting on the east Delta and in the Controller Bay drainage (Figure 3). Nest success was 0.64, 0.24, and 0.34 on the west delta, east delta, and Controller Bay drainage, respectively. The number of young per occupied nest, a productivity statistic based on the number of known territorial pairs (as evidenced by the presence of a nest), was 1.5 (average = 1.6) for the entire study area, and average brood size was 3.8 (average = 3.3) (Table 3). The proportion of young in the early

fall population was 0.23, up 21% from 1996 and 10% above the 22-year average (Table 2).

DISCUSSION

The population of white swans on the study area increased steadily between 1978 and 1985, in response to several years of good to excellent reproductive success during the early 1980's (Table 3). The population leveled off in fall 1985 at 898 white swans and began a reverse trend, declining to a low of 526 white swans in fall 1991. Since then, the number of white swans has increased slightly and seems to have stabilized (Figure 2). Reproductive success has fluctuated over the years, likely due in large part to weather conditions during the breeding season. Production in 1997 was average, an improvement over the below-average production that occurred in recent years.

BIAS

Possible sources of bias in these data come from using different pilots and observers with variable levels of experience and training, using more than one type of aircraft, and surveying in variable weather conditions. However, by using a standardized system, comparable sets of data were collected as evidenced by comparable recorded flight paths and mileages flown.

RECOMMENDATIONS

We now have 41 comparable trumpeter swan surveys (19 spring and 22 fall) on the Copper River Delta, one of the most complete records for any swan population in Alaska. We recommend continuing a cooperative program of two surveys per year. Information acquired from both the early and late phases of the breeding season has greatly enhanced our ability to understand the factors influencing the population's reproductive success. Long term, standardized data sets such as these are an invaluable tool for evaluating population dynamics and properly managing trumpeter swan breeding populations.

ACKNOWLEDGMENTS

The following people and agencies are gratefully acknowledged for their participation in the swan surveys:

Year	Spring Survey Personnel	Fall Survey Personnel
1968		J. King, J. Bartonek - USFWS
1975		J. King, T. Schoenfelder - USFWS
1978	G. Bucaria, S. Watson - USFS	G. Bucaria, S. Watson - USFS
1979		C. Moitoret - USFS
1980	G. Bucaria, D. Logan - USFS	J. King, B. Conant - USFWS
1981	G. Bucaria - USFS	J. King, B. Conant - USFWS
1982	R. King, G. Bucaria- USFWS, USFS	J. King, B. Conant - USFWS
1983	R. King, Zimmerman - USFWS	B. Conant, D. Derksen, J. Baker, M. Jacobson - USFWS G. Covell, Broekema - USFS
1984	R. King, R. Leedy - USFWS	B. Conant, J. Hodges - USFWS
1985	R. King, T. Simon-Jackson -USFWS	B. Conant, S. Cain - USFWS
1986	R. King, K. Bollinger - USFWS	B. Conant, J. Hodges - USFWS
1987	R. King, M. North - USFWS	B. Conant, J. Hodges - USFWS
1988	R. King, R. Pospahala - USFWS	B. Conant, J. Hodges, M. Jacobson - USFWS
1989	R. King, F. Gerhardt - USFWS	B. Conant, R. Oates, M. Jacobson - USFWS
1990	R. King, A. Brackney - USFWS	B. Conant, D. Groves, J. King - USFWS
1991	R. King, A. Brackney - USFWS	B. Conant, D. Groves - USFWS
1992	R. King, D. Youkey - USFWS, USFS	J. Hodges, J. King - USFWS
1993	R. King, D. Youkey - USFWS, USFS	J. Hodges, D. Groves - USFWS D. Youkey - USFS
1994	R. King, P. Greene - USFWS, USFS	B. Conant, D. Groves - USFWS
1995	R. King, B. Leedy - USFWS	B. Conant, E. Lucas - USFWS
1996	R. King, S. Hill - USFWS	J. Hodges, D. Groves - USFWS
1997	R. King, T. Tiplady - USFWS	B. Conant, G. Fowler - USFWS, Ducks Unlimited Canada

LITERATURE CITED

- Conant, B., J. I. Hodges, J. G. King, and S. L. Cain. 1985. Alaska trumpeter swan status report - 1985. U.S. Fish and Wildlife Service Report, Juneau, Alaska. 10 pp.
- _____, _____, D. J. Groves, and J. G. King. 1991. Alaska trumpeter swan status report - 1990. U.S. Fish and Wildlife Service Report, Juneau, Alaska. 31 pp.
- _____, _____, _____, and _____. 1996. Alaska trumpeter swan status report - 1995. U.S. Fish and Wildlife Service Report, Juneau, Alaska.
- Hansen, H. A., P. E. K. Shepherd, J. G. King, and W. A. Troyer. 1971. The trumpeter swan in Alaska. Wildl. Mono. No. 26: 1-83.
- King, J. G. 1973. The use of small airplanes to gather swan data in Alaska. Wildfowl 24:15-20.
- _____. 1976. Trumpeter swan survey in Alaska. The 5th Trumpeter Swan Society Conference.
- _____ and B. Conant. 1981. The 1980 census of trumpeter swans in Alaskan nesting habitats. American Birds, vol. 35, no. 5, pp. 789-93.

Table 1. Spring survey swan observations - Chugach National Forest (1978-1997).

Year	Miles Flown	Observations	White Swans				Cygnet	Total Swans
			Paired	Single	Flocked	Subtotal		
5/78	967	192	278	20	362	660	--	660
5/80	783	222	320	45	169	534	--	534
5/81	924	244	350	37	235	622	--	622
6/82	852	247	356	44	200	600	--	600
6/83	--	297	448	47	144	639	23	662
6/84	1074	324	502	43	190	735	--	735
6/85	986	309	452	50	235	737	--	737
5/86	935	304	508	35	123	666	--	666
5/87	--	291	462	39	101	602	--	602
5/88	--	263	418	42	116	576	5	581
5/89	--	241	400	28	174	602	--	602
5/90	989	226	374	25	121	520	--	520
5/91	966	250	394	34	152	580	--	580
5/92	905	249	412	25	195	632	--	632
5/93	985	248	394	25	159	578	--	578
5/94	912	278	436	31	204	671	--	671
5/95	921	246	402	24	157	583	--	583
5/96	915	267	442	27	125	594	--	594
5/97	934	246	406	27	84	517	--	517
19 Yr. Avg.	^a 937	260	408	34	171	613	--	615

a Fifteen year average.

Table 2. Fall survey swan observations - Chugach National Forest (1968-1997).

Year	Miles Flown	Observations	White Swans				Cygnets	Young in Pop. (%)	Total Swans
			Paired	Single	Flocked	Subtotal			
8/68	851	199	326	24	181	531	267	33	798
8/75	1125	196	312	24	142	478	131	22	609
8/78	1088	186	248	36	127	411	103	20	514
8/79	887	160	234	20	217	471	143	23	614
8/80	1961	262	410	33	187	630	216	26	846
8/81	1541	234	374	16	287	677	266	28	943
8/82	1644	271	436	27	227	690	152	18	842
8/83	1948	314	512	32	219	763	259	25	1022
8/84	1731	303	448	42	400	890	228	20	1118
8/85	1952	348	534	45	319	898	111	11	1009
8/86	1611	298	490	25	200	715	188	22	903
8/87	1648	318	510	46	175	731	64	8	795
8/88	1600	281	472	29	145	646	217	25	863
8/89	1578	278	460	41	98	599	117	16	716
8/90	1710	267	424	35	169	628	245	28	873
8/91	1247	253	400	36	90	526	136	21	662
8/92	1025	197	314	19	231	564	250	31	814
8/93	1158	237	368	29	218	615	201	25	816
8/94	1486	260	382	24	404	810	131	14	941
8/95	1659	280	408	51	185	644	97	13	741
8/96	1231	259	430	23	176	629	151	19	780
8/97	1533	259	416	25	157	598	175	23	773
22 Yr. Avg.	1464	257	405	31	207	643	175	21	818

Table 3. Swan productivity - Chugach National Forest (1968-1997).

Year-Survey	Pairs w/ Nest or Brood (%)	Nests or Broods	Average Brood Size	a Nest Success	b Young Per Occupied Nest
68 - Spring Fall	-- 40	-- 67	4.0	--	--
75 - Spring Fall	-- 24	-- 39	3.4	--	--
78 - Spring Fall	51 26	78 32	3.2	0.41	1.3
79 - Spring Fall	-- 34	-- 41	3.5	--	--
80 - Spring Fall	59 30	94 62	3.5	0.66	2.3
81 - Spring Fall	58 34	120 67	4.0	0.56	2.2
82 - Spring Fall	40 23	83 51	3.0	0.61	1.8
83 - Spring Fall	27 27	68 71	3.6	1.04	3.8
84 - Spring Fall	53 27	143 61	3.7	0.43	1.6
85 - Spring Fall	42 13	103 37	3.0	0.36	1.1
86 - Spring Fall	52 24	140 60	3.1	0.43	1.3
87 - Spring Fall	43 10	115 25	2.6	0.22	0.6
88 - Spring Fall	59 29	133 68	3.2	0.51	1.6
89 - Spring Fall	63 17	130 38	3.1	0.29	0.9
90 - Spring Fall	67 33	130 70	3.5	0.54	1.9
91 - Spring Fall	64 25	129 49	2.8	0.38	1.1
92 - Spring Fall	65 46	134 73	3.4	0.54	1.9
93 - Spring Fall	59 32	118 61	3.3	0.52	1.7
94 - Spring Fall	57 23	130 44	3.0	0.34	1.0
95 - Spring Fall	56 17	115 35	2.8	0.30	0.8
96 - Spring Fall	48 19	106 40	3.8	0.38	1.4
97 - Spring Fall	55 25	117 54	3.2	0.46	1.5
19 Yr. Avg.-Spring	54	115	--	0.47	1.6
22 Yr. Avg.-Fall	26	52	3.3	--	--

a Proportion of total nests that produced 1 or more young to near fledging age.

b Total number of young divided by total number of nests (territorial pairs).

c No survey was performed.

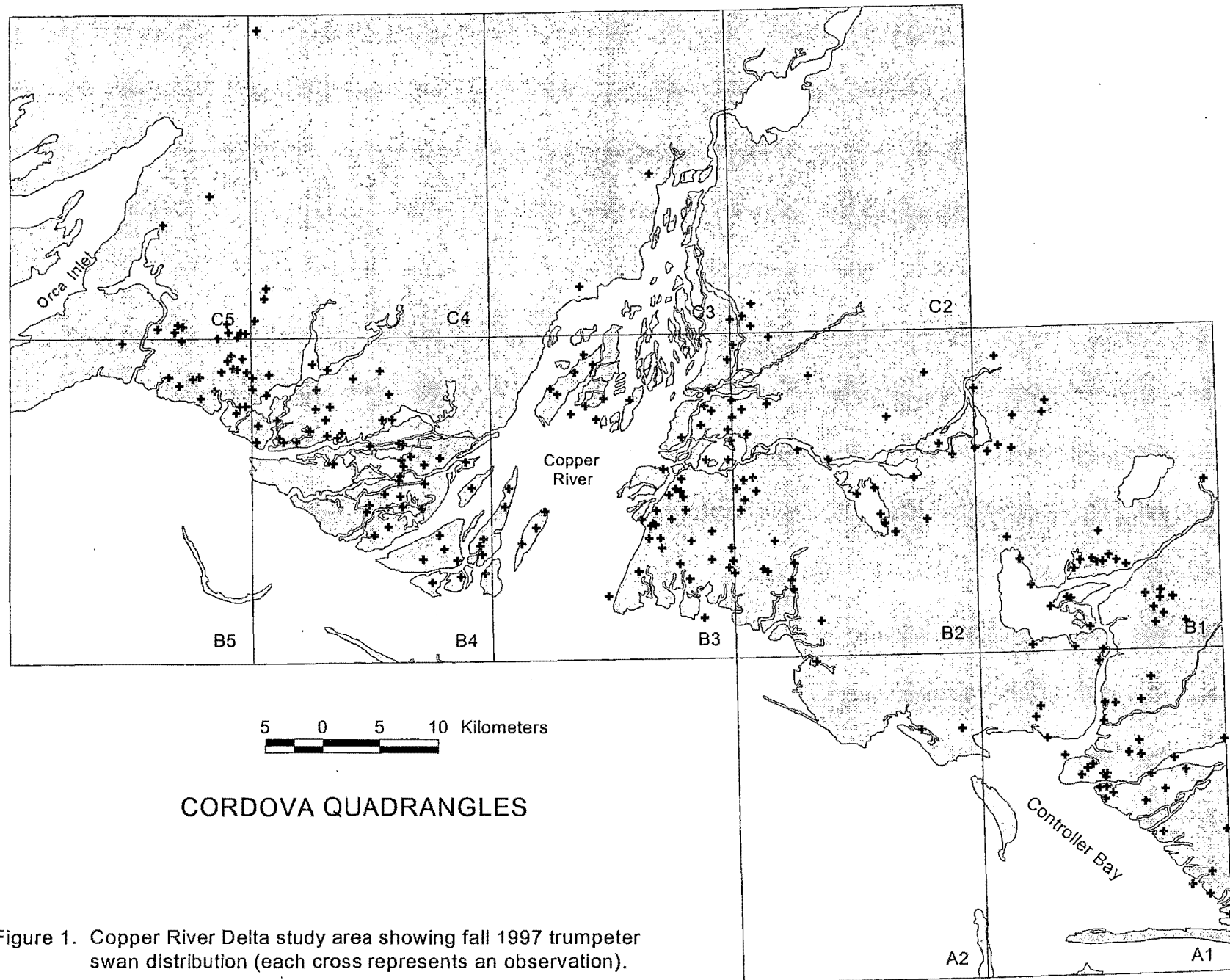


Figure 1. Copper River Delta study area showing fall 1997 trumpeter swan distribution (each cross represents an observation).

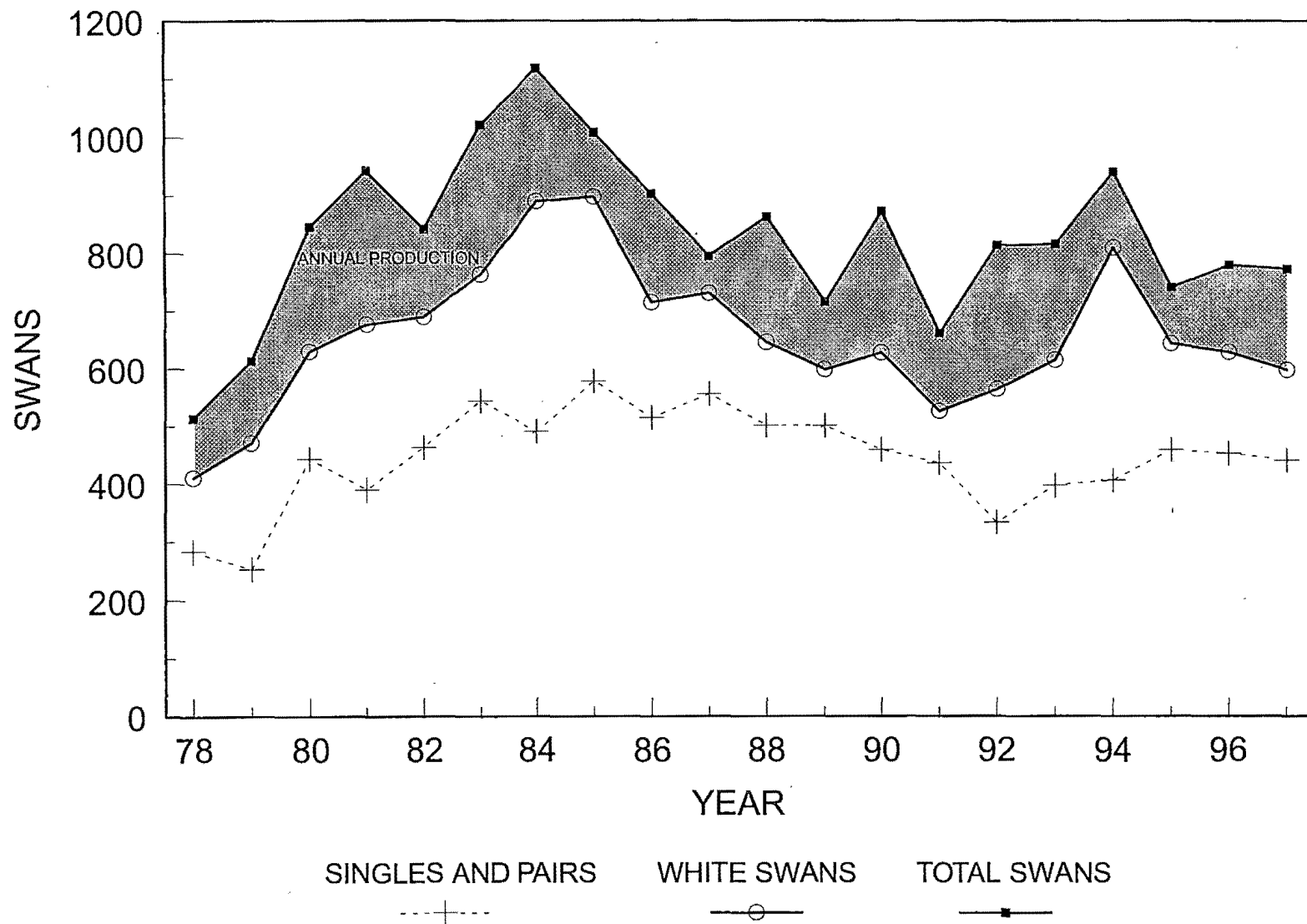


Figure 2. Population trend of trumpeter swans on the Copper River Delta study area, 1978-1997.

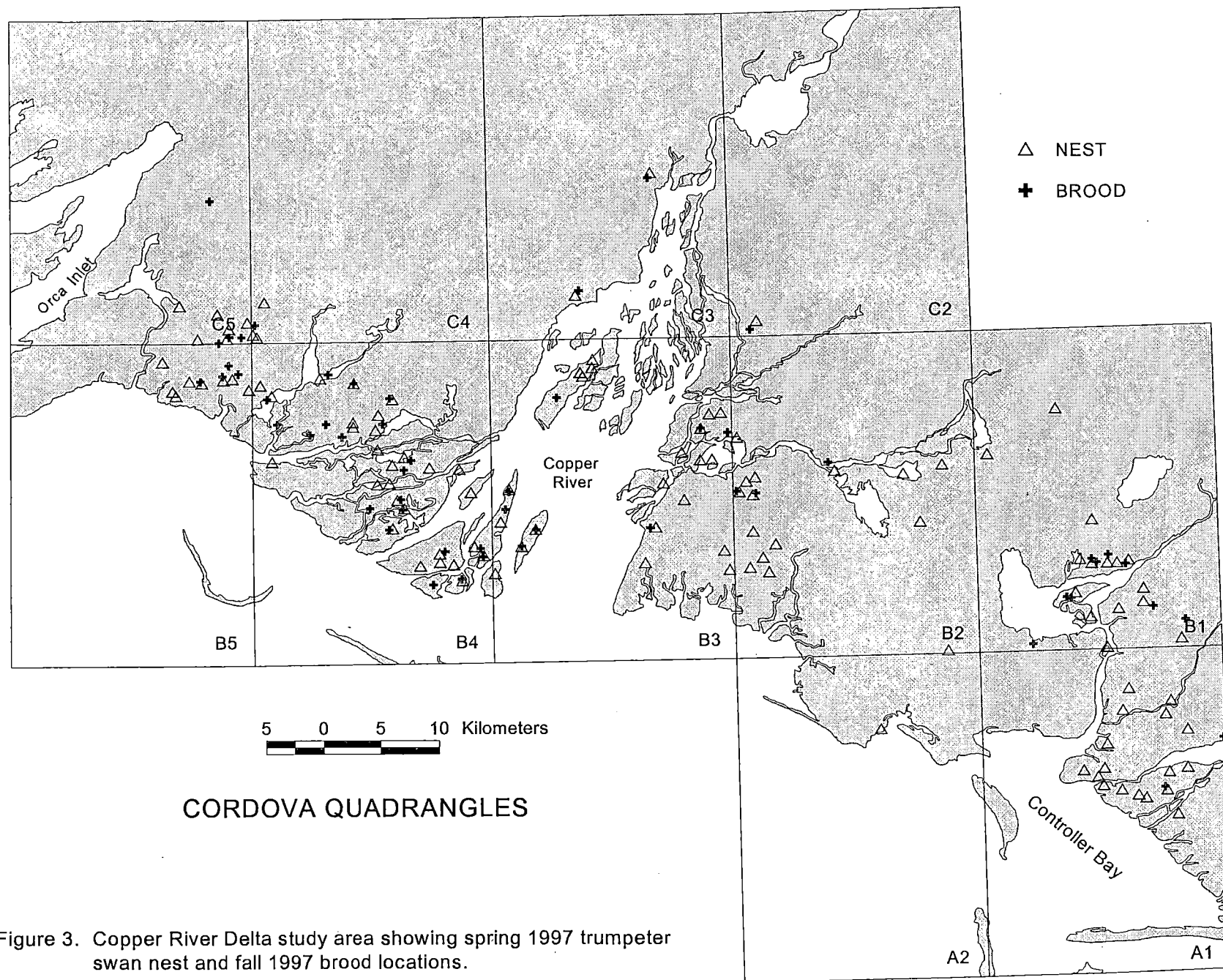


Figure 3. Copper River Delta study area showing spring 1997 trumpeter swan nest and fall 1997 brood locations.

TRUMPETER SWAN SURVEY
COPPER RIVER DELTA
SPRING 1997

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MAP	D	QD	DATE	OBS	SNG	PRS	FKS	BRD	BRD	BRD	NEST	NEST	BRDS	NESTS	PRS	FKS	ADU	YNG	EGG	SWANS	ADU	YNG	EGG	SWANS
96	A1	0	52697	40	5	66	7	0	0	0	14	3	0	17	33	2	78	0	0	78	0	0	78	0
96	A2	0	52697	4	1	6	0	0	0	0	1	0	0	1	3	0	7	0	0	7	0	0	7	0
96	B1	0	52697	38	5	60	27	0	0	0	15	0	0	15	30	3	92	0	0	92	0	0	92	0
96	B2	0	52697	29	1	52	9	0	0	0	15	0	0	15	26	2	62	0	0	62	0	0	62	0
96	B3	0	52697	43	3	74	13	0	0	0	20	1	0	21	37	3	90	0	0	90	0	0	90	0
96	B4	0	52697	50	9	78	10	0	0	0	26	2	0	28	39	2	97	0	0	97	0	0	97	0
96	B5	0	52697	15	2	24	6	0	0	0	8	0	0	8	12	1	32	0	0	32	0	0	32	0
96	C2	0	52697	4	0	6	3	0	0	0	1	0	0	1	3	1	9	0	0	9	0	0	9	0
96	C3	0	52697	4	0	8	0	0	0	0	2	0	0	2	4	0	8	0	0	8	0	0	8	0
96	C4	0	52797	6	0	10	5	0	0	0	3	0	0	3	5	1	15	0	0	15	0	0	15	0
96	C5	0	52797	13	1	22	4	0	0	0	6	0	0	6	11	1	27	0	0	27	0	0	27	0
*** Total ***				246	27	406	84	0	0	0	111	6	0	117	203	16	517	0	0	517	0	0	517	0

FALL 1997

Q			#		PRS SNG		O PRS SNG		#		#		#		#									
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MAP	D	QD	DATE	OBS	SNG	PRS	FKS	BRD	BRD	BRD	NEST	NEST	BRDS	NESTS	PRS	FKS	ADU	YNG	EGG	SWANS	ADU	YNG	EGG	SWANS
96	A1	0	81597	35	1	62	18	2	0	0	0	0	2	0	31	3	81	12	0	93	0	0	93	0
96	A2	0	81497	3	0	4	4	0	0	0	0	0	0	0	2	1	8	0	0	8	0	0	8	0
96	B1	0	81597	37	2	56	73	8	0	1	0	0	9	0	28	6	131	27	0	158	0	0	158	0
96	B2	0	81597	35	4	54	15	3	0	0	0	0	3	0	27	4	73	3	0	76	0	0	76	0
96	B3	0	81697	52	6	88	11	7	1	0	0	0	8	0	44	2	105	25	0	130	0	0	130	0
96	B4	0	81797	57	8	96	3	20	0	0	0	0	20	0	48	1	107	65	0	172	0	0	172	0
96	B5	0	81797	18	2	24	16	4	0	0	0	0	4	0	12	4	42	17	0	59	0	0	59	0
96	C2	0	81697	4	0	6	4	1	0	0	0	0	1	0	3	1	10	4	0	14	0	0	14	0
96	C3	0	81697	2	0	4	0	2	0	0	0	0	2	0	2	0	4	7	0	11	0	0	11	0
96	C4	0	81697	4	0	4	10	1	0	0	0	0	1	0	2	2	14	2	0	16	0	0	16	0
96	C5	0	81797	12	2	18	3	4	0	0	0	0	4	0	9	1	23	13	0	36	0	0	36	0
*** Total ***				259	25	416	157	52	1	1	0	0	54	0	208	25	598	175	0	773	0	0	773	0