

Trumpeter Swan management

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By 1920, following more than a century of exploitation and intolerable human encroachment, the magnificent Trumpeter Swan *Cygnus cygnus buccinator* was conceded by many to be on the brink of extinction, in all likelihood past the point of no return. Fifty years later this native of the North American continent, the largest waterfowl in the world, had recovered sufficiently for it to be officially declared no longer an endangered species, even though the population is still small by many standards.

This remarkable recovery is, in part, the result of protection from legalized hunting, intensive management of remnant populations, and the beginning of a successful transplanting programme. Entirely independent of man's heroic restoration effort in this area, an undiscovered Trumpeter Swan population in Alaska and along the North Pacific Coast was concurrently thriving. Subsequently, detailed studies of these two major population groups were conducted and reported in detail (Banko, 1960; Hansen *et al.*, 1971). Therefore, this will be a brief summary of the current population status of the Trumpeter Swan in North America and of the attempt to re-establish this species throughout its ancestral range.

In comparison with the Arctic-nesting Whistling Swan *Cygnus c. columbianus*, the Trumpeter, North America's only other native swan, probably never maintained numerically strong populations. Furthermore, its habits and range rendered it far more susceptible to human exploitation. By 1932 there were only sixty-nine Trumpeter Swans known to exist in the United States, south of Canada. These were in the remote high mountain valleys where the States of Montana, Idaho, and Wyoming join. The precarious condition of the Trumpeter led to the acquisition of the Red Rock Lakes National Wildlife Refuge in Montana in 1935 by the U.S. Government. With the protection afforded the Trumpeters there and in the adjacent Yellowstone National Park, the population quickly began to increase and continued to grow until about 1950 when the nesting habitat became too crowded. The population in that area has become stabilized since then at about 300 swans with a very low reproduction rate (Table 1 and Figure 1).

The Trumpeter Swan is notoriously slow to pioneer new areas, particularly where there are long distances between suitable areas of breeding habitat or geographical barriers such as mountain ranges. Thus, by the time the habitat at Red Rock Lakes became saturated, the limited number of suitable nesting areas within a 100-mile radius were also filled. From the outset it was obvious that the Trumpeter needed additional help to come back all the way. It was this knowledge and a desire to accelerate the return of the Trumpeter that led to the transplanting programme. Monnie (1964) and Marshall (1968) have reported the Government's effort to relocate breeding colonies of Trumpeter Swans. The following summary is taken from their accounts.

The first transplant of Trumpeters was made in 1938 when four cygnets from the Red Rock Lakes Refuge were moved to the National Elk Refuge at Jackson, Wyoming, approximately 160 km south. During the next 3 years, six more cygnets were released among these original four. In 1944, 6 years after the initial release, a pair nested successfully and raised one cygnet. From this modest beginning swans quickly filled the available breeding habitat in western Wyoming and adjacent Idaho. The population has been more or less stabilized in this area since about 1950.

Other transplants initiated at about the same time took much longer to bear fruit. Between 1939 and 1955 a total of 137 Trumpeters were translocated from Red Rock Lakes to the Malheur National Wildlife Refuge in southeastern Oregon, and eighty-four were moved to Ruby Lake National Wildlife Refuge in northeastern Nevada between 1949 and 1955. The first successful nesting in each of these areas occurred in 1958 from 3-year-old swans which had arrived as cygnets in the 1955 transplant. As happened with the earlier transplant on the National Elk Refuge in Wyoming, these swans soon utilized the nesting habitat available to them, not only on the refuges but in surrounding marshes, and have maintained static populations for several years.

The most recent successful transplant in this general area of the continent was at the Turnbull National Wildlife Refuge in eastern Washington. Thirty-six swans from

Table 1. Trumpeter Swan populations south of Canada, 1932–1968

Year	Red Rock Lakes Refuge			Yellowstone Park			All other areas			Total, all areas		
	Adults	Cyg-nets	Total	Adults	Cyg-nets	Total	Adults	Cyg-nets	Total	Adults	Cyg-nets	Total
1932	19	7	26	29	2	31	9	3	12	57	12	69
1933	15	9	24	27	8	35	7	0	7	49	17	66
1934	16	26	42	16	17	33	16	6	22	48	49	97
1935	30	16	46	16	11	27	No census		—	46	27	73
1936	31	26	57	38	13	51	7	2	9	76	41	117
1937	34	51	85	38	26	64	9	0	9	81	77	158
1938	28	42	70	40	4	44	25	9	34	93	55	148
1939	50	59	109	47	17	64	26	0	26	123	76	199
1940	58	48	106	39	14	53	26	6	32	123	68	191
1941	52	44	96	44	15	59	47	10	57	143	69	212
1942	45	43	88			*	53	10	63	98	53	151
1943	88	25	113			*	49	9	58	137	34	171
1944	106	58	164	41	8	49	60	6	66	207	72	279
1945	113	50	163			*	67	5	72	180	55	235
1946	124	46	170	43	8	51	122	18	140	289	72	361
1947	131	49	180	45	8	53	116	3	119	292	60	352
1948	121	73	194	49	13	62	142	20	162	312	106	418
1949	132	61	193	54	21	75	162	21	183	348	103	451
1950	106	40	146	57	16	73	140	17	157	303	73	376
1951	170	76	246	63	11	74	184	31	215	417	118	535
1952	184	55	239	58	10	68	236	28	264	478	93	571
1953	211	38	249	51	10	61	216	51	267	478	99	577
1954	352	28	380	64	23	87	144	31	175	560	82	642
1955	242	41	283	58	10	68	195	44	239	495	95	590
1956	293	39	332	48	9	57	166	33	199	507	81	588
1957	159	45	204	44	16	60	196	28	224	399	89	488
1958	270	40	310	64	18	82	231	80	311	565	138	703
1959	271	40	311	62	8	70	249	51	300	582	99	681
1960	163	34	197	56	7	63	353	53	406	572	94	666
1961	155	14	169	71	3	74	310	66	376	536	83	619
1962	179	53	232	44	7	51	296	56	352	519	116	635
1963	145	122	275	49	7	56	294	98	392	488	227	715
1964	180	22	202	61	8	69	458	35	493	699	65	764
1965	190	16	206	60	5	65	433	78	511	683	99	782
1966	240	54	294	57	12	69	418	99	517	713	165	878
1967	184	20	204	55	2	57	464	71	535	701	93	794
1968	155	90	245	57	4	61	489	112	601	701	206	907

*No census

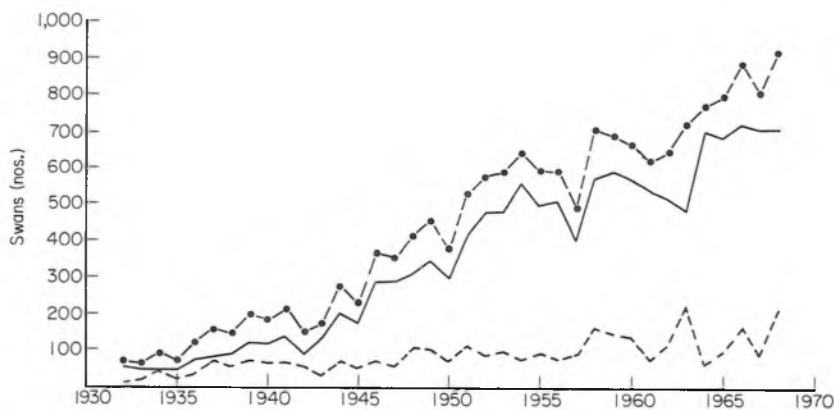


Figure 1. Trumpeter Swan population, south of Canada, 1932–1968. —, Adults; ---, cygnets; ····, total swans.

Red Rock Lakes were released at Turnbull from 1964 through 1966. The first brood was raised from one of these pairs in 1967. Since then, nesting has occurred off the refuge as well, up to 32 km from the original release site. As in the west, limited habitat will not allow for a greatly expanded population in eastern Washington.

Although Nevada and southern Oregon, where Trumpeter Swans are now breeding in limited numbers, are both outside the historical breeding range of this species, and eastern Washington is at the western limit, much was learned from these initial attempts that has facilitated reintroductions elsewhere. Banko (1960) was of the opinion that the chief factor contributing failure in the early transplanting efforts was the practice of pinioning and confining the flock to a single large pool. Intra-specific strife and spatial competition not only created a situation unfavourable for breeding, but it led to significant losses from accident and disease. On the other hand, liberating the transplanted individuals unrestricted into the large open marsh resulted in the liberated birds quickly dispersing and they disappeared.

Consistent success has since been achieved, with transplanted Trumpeters breeding as early as their third year of life. The technique consists of transplanting cygnets prior to flight in September. The birds are wing-clipped to render them flightless throughout the winter and until the following moult, and held semi-captive in spring-fed enclosures. Supplemental feeding is provided as required. This method allows the swan to become familiar with the new environment slowly and to develop a traditional attachment to the area. When they regain flight the following summer, they are then free to explore the surrounding marshes from a home base and complete their maturation under entirely natural conditions.

With little chance for more than limited ultimate success on the western edge of the Trumpeters breeding range, U.S. Fish and Wildlife Service biologists turned their attention eastward to the plains States. The initial reintroduction of Trumpeters into this heartland of their ancestral breeding range was made on the Lacreek National Wildlife Refuge, in south-central South Dakota, which contains about 40 sq. km, over half of which is water and marsh. Despite severe winter weather, fresh water flows through the refuge during the entire year from constant springs in nearby hills. A large winter holding pen was built, with

food-hoppers to supplement the natural feed available in the open marsh.

In the 3-year period 1960–1962, a total of fifty-seven cygnets (twenty, seventeen, and twenty respectively) were transplanted from Red Rock Lakes to Lacreek during the month of September each year. Each of the three flocks was wing-clipped upon arrival and released into the holding pen. During the summer of 1963 two pairs from the 1960 release raised young on the refuge. These same two pairs plus another again produced young on the refuge in 1964 and three other pairs nested successfully off the refuge. One nest was located about 96 km north and another 29 km south-east. The third nesting pair was not located but they returned to the refuge in the fall with cygnets. This population has continued to prosper. In the summer of 1969 there were six nests on the Lacreek Refuge and four others located within a radius of 96 km. Eighty swans returned to the refuge that fall, but only seventy survived the winter.

The success at numerous Federal refuges under a wide variety of conditions indicated that the technique of managing transplanted populations into sustained reproduction was sound and warranted wider application. Thus was born the first Trumpeter Swan restoration project in the United States (outside zoological parks) by an agency other than the Federal Government. The Hennepin County Park Reserve District has established a producing flock of Trumpeters from Red Rock Lakes stock in Carver County, Minnesota, about 25 miles from the City of Minneapolis. The first pair was acquired by the Park Reserve in 1966, twenty more in 1967 and ten cygnets in 1968. From this beginning the first known nesting of Trumpeter Swans in Minnesota since the 1880s resulted in the hatching of one cygnet on 21 June, 1969. Although this cygnet disappeared shortly before it was a month old this initial attempt gave reason for optimism. In 1970 a pair again nested on the Park Reserve (presumably the same pair) and hatched five cygnets. Another pair nested on a 12-ha marsh outside the Reserve. Unfortunately, there is an unnecessarily high loss of swans in this area, probably resulting from a large human population oriented toward outdoor recreation both summer and winter.

Inasmuch as several healthy, widely-scattered populations of Trumpeter Swans now exist and the species is no longer threatened, it is desirable, both for the welfare of the birds and for public enjoyment,

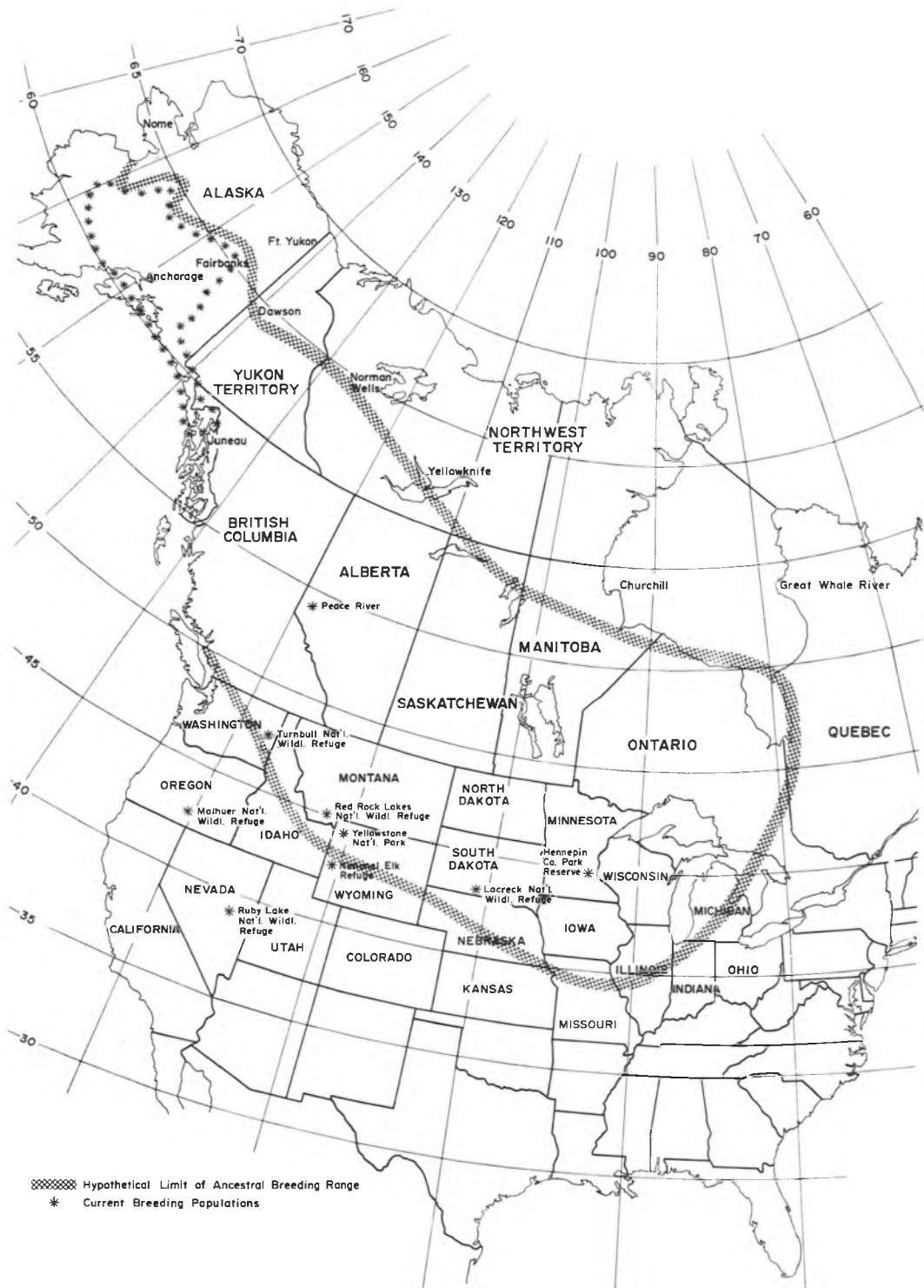


Figure 2. Trumpeter Swan breeding boundaries.

to re-establish swans at other locations within their former breeding range. In order to ensure maximum success and provide adequately for the welfare of the birds, guidelines are being established for all new releases.

Several important factors are limiting the rate at which Trumpeter Swans can be restored throughout their traditional breeding range. Experience has shown that, to achieve reproduction at the earliest possible age, swans should be transplanted as cygnets prior to attaining flight, preferably in September of their natal year.

The Trumpeter Swan has large territorial requirements during the breeding season, free of competition from its own kind and relative isolation from human intrusion. Marsh habitat must be reasonably stable with no marked fluctuations in water level. These basic requirements have been observed in all populations of Trumpeters throughout their range, including Alaska. For example, it has been estimated that the 20 sq. km of marsh habitat on the Lacreek Refuge will successfully accommodate no more than ten Trumpeter nesting territories. Marshall (1968) states that '... it appears as though the total number of nesting Trumpeters which can be supported on the 180,000-acre Malheur Refuge is only about 50. Malheur Refuge is one of the largest in the 48 contiguous States and contains the largest natural marsh remaining in the west outside Alaska.' In his extensive study at Red Rock Lakes, Banko (1960) found the highest concentration of nests on a shallow lake where the irregular shoreline combined with numerous stable sedge islands to provide the greatest variety and interspersions of water and marsh habitat. This lake of about 200 ha supported seven nesting pairs of Trumpeters in 1957, about 30 ha of territory per pair. On a deeper, less attractive lake of 600 ha on the refuge only ten pairs nested, about 60 ha per pair. Banko noted that 'a certain amount of water space, presumably to meet flight take-off requirements, appears necessary within each territory and the large number of potholes over the refuge which often produce considerable food are not an important segment of the breeding habitat.' We found territorial requirements in Alaska, where crowding has not yet become a serious factor, to be generally larger than at Red Rock Lakes and the other refuges.

Perhaps one of the most serious limiting factors to population growth and a more rapid extension of range is the non-migrant trait of Trumpeter Swans which live south of Canada. It is ironic that this inhibiting

trait may well have been the most important single factor that saved the species from extinction. Those swans which were forced by weather to migrate annually from the northern breeding grounds in Canada south into the path of American settlers were soon extirpated, whereas the sedentary birds in the high mountain valleys of southwestern Montana were much less subject to man's relentless pursuit and, thus, survived.

A by-product of the non-migrant trait of Trumpeters, as they are gradually restored farther north across their ancestral range, is the necessity to provide them with adequate food and open water during the winter months. Up to a point, food can be supplied in any quantity that economics and logistics allow. But an adequate supply of open water, in the absence of natural springs, is next to impossible especially from the Canadian border northward east of the Rocky Mountains. A wintering population now numbering about 400 Trumpeters is maintained through an artificial feeding programme on Lonesome Lake in British Columbia (lat. 52° 30'N.). The source of these birds is conjectural at present. It seems likely that they derive from the Alaska breeding grounds, however, inasmuch as there are no known breeding populations of that size in British Columbia. Be that as it may, a wintering flock of 400 swans maintained artificially in the north is cause for concern. Not only is it costly and difficult to supply adequate food at such a remote location, but such a large concentration of birds under artificial conditions with a limited water supply might be conducive to serious outbreaks of disease.

The Trumpeter Swans which nest in Alaska must migrate as their breeding marshes are frozen from late September through April. However, they tend to move down the Pacific Coast only as far as necessary to find adequate wintering conditions. In recent years, as that population has grown to an estimated 3,500–4,000 birds, some Trumpeters move south as far as the mouth of the Columbia River which was part of their traditional wintering ground prior to settlement of the west coast (Hansen *et al.*, 1971) (Figure 2).

If a migrating tradition could be re-established in the Trumpeter Swan and adequate propagating techniques developed, the greatest potential for restoring this species in relatively large numbers lies in the prairie provinces of Canada north of the current agricultural belt. This area appeared to contain the greatest abundance

of Trumpeters prior to white man's exploitation and the potential for favourable production remains. Large, stable marshes in a wilderness setting are available in reasonable numbers and human disturbance during the critical nesting season would be minimal.

Some discussion has centered around the possibility of using Alaskan stock with its migratory tradition, in lieu of the sedentary Red Rock Lakes' Trumpeters, to accelerate the northward spread of the species into Canada. Although this may seem to be meritorious at a hasty glance, there may be an overriding reason against it. From the detailed studies conducted both at Red Rock Lakes and in Alaska, it appears that these two widely-separated populations of Trumpeters may be distinct subspecies. There are significant physical differences, the Alaska Trumpeters being larger, starting from the egg. Based on a limited amount of banding and colour marking in both populations, we have no evidence of an interchange between the two. It appears likely that these two populations have evolved distinct from each other.

As long as the possibility of subspeciation between these diverse populations exists, or until disproved, there seems to be no justification for such a major tampering.

One possibility remains. A small, apparently static, breeding population of Trumpeters exists in the Peace River area northwest of Edmonton, Alberta, in Canada. This population numbers approximately 100 birds. It has been speculated that these swans may contribute to the wintering population at Lonesome Lake in British Columbia. From banding of a few swan families on the Peace River breeding grounds, subsequent recoveries at Red Rock Lakes and in the Dakotas indicate that these Trumpeters move south down the eastern side of the Rocky Mountains instead of west (Mackay, 1957). In fact, attrition from illegal hunting may be the limiting factor to the natural expansion of this population, just as it inhibits population growth elsewhere.

Movement some 1,760 km south from their natal marshes during two consecutive autumns subsequent to banding shows a rather firm migrating tradition in this Peace River population. This, then, could provide the proper nucleus stock from which to re-establish Trumpeter Swans on their northern ancestral marshes.

The task would be neither simple nor quickly accomplished. The techniques for

transplanting cygnets and successfully initiating reproduction in 3-year-old swans in the south of Canada may not be applicable in the north. Until the reasons why the Peace River population remains more or less static are identified and corrected, if possible, there may be too few cygnets to risk further loss through unsuccessful experimentation. Meanwhile it is imperative that adequate protection be afforded to all the nucleus flocks we have established so that the species can increase and spread naturally to its innate potential. A continuing campaign must be maintained to develop public awareness of and sympathy for the Trumpeter Swan restoration project. The physical characteristics of a swan in flight should be so well indoctrinated in hunters that mistaken identity can no longer be an excuse for shooting one. For example, in early October 1971, a mated pair of Trumpeter Swans from the newly established population in the Hennepin County Park Reserve District were mistakenly shot for snow geese when they wandered beyond the refuge boundary. To his credit, however, the errant hunter reported himself to the authorities when he realized his mistake.

To see Trumpeter Swans once again complete the array of North American wildfowl in their traditional manner will be worth all the ingenuity and whatever effort Man can muster.

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