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RESPONSE OF TRUMPETER SWANS TO TRAPPING AT RED ROCK LAKES NATIONAL WILDLIFE REFUGE, MONTANA, AND HARRIMAN STATE PARK, IDAHO, WINTER 1990-91

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ABSTRACT

THE ROCKY MOUNTAIN POPULATION (RMP) OF TRUMPETER SWANS (*CYGNUS BUCCINATOR*) WINTERS IN THE TRISTATE AREA OF IDAHO, MONTANA AND WYOMING AND HAS INCREASED FROM 600+ IN 1972-73 TO 2000+ IN 1989-90. IN 1989-90, 60% OF THE RMP WINTERED IN THE VICINITY OF RED ROCK LAKES NATIONAL WILDLIFE REFUGE (RRLNWR), MONTANA, AND HARRIMAN STATE PARK (HSP), IDAHO. DECLINING AQUATIC VEGETATION AT HSP AND INCREASING CONCENTRATIONS OF SWANS DEPENDING ON AN ARTIFICIAL FEEDING PROGRAM AT RRLNWR LED TO EFFORTS TO CAPTURE AND DISPERSE SWANS FROM THE RRLNWR/HSP AREA DURING WINTER 1990-91. ABOUT 1,500 SWANS RETURNED TO THE AREA IN AUTUMN 1990, A 25% INCREASE FROM FEBRUARY 1990. TRAPPING REMOVED 353 SWANS WHICH WERE TRANSLOCATED TO MORE SOUTHERLY WINTERING SITES WHILE AN ESTIMATED 400 SWANS DISPERSED IN RESPONSE TO DISTURBANCE. SWANS DISPERSED FROM BOTH RRLNWR AND HSP DURING HIGH DISTURBANCE PERIODS OF NIGHT LIGHTING. LOWER DISTURBANCE ASSOCIATED WITH BAIT TRAPPING WAS NOT ADEQUATE TO DISPERSE SWANS FROM RRLNWR WHILE HIGH DISTURBANCE NIGHT LIGHTING OCCURRED AT HSP. SWANS SHIFTED FROM HSP TO THE FEEDING PONDS AT RRLNWR IN MID-FEBRUARY, TWO TO THREE WEEKS EARLIER THAN IN THE PREVIOUS WINTER. COMPARED TO THE PREVIOUS WINTER, NUMBERS DECREASED BY 71% AT HSP AND INCREASED BY 75% AT RRLNWR BY 22 FEBRUARY 1991. LONG-TERM REDUCTION OF SWAN USE IN THE RRLNWR/HSP VICINITY IS UNLIKELY UNLESS HIGH LEVELS OF DISTURBANCE OCCUR ANNUALLY AT BOTH LOCATIONS AND CANADIAN TRUMPETERS ARE AGGRESSIVELY EXCLUDED FROM THE ARTIFICIAL FEEDING PROGRAM AT RRLNWR.

INTRODUCTION

The RMP is comprised of the relatively sedentary Tristate Subpopulation (TSP) which summers in Idaho, Montana and Wyoming, and the migratory Interior Canada Subpopulation (ICSP) which summers in Alberta, British Columbia, Northwest Territories, Saskatchewan and Yukon Territory. Both subpopulations winter together in the Tristate Region, in and near Yellowstone National Park.

Trumpeter Swans from both subpopulations have been collared in various studies since 1956 (Mackay 1957, Gale *et al.* 1987). A few RMP swans have been observed wintering in Colorado, Utah, Nevada, Oregon and California, and unmarked Trumpeters were

reported in the Rio Grande Valley, New Mexico. These sightings confirm winter dispersal by a few RMP swans. Since 1956, however, over 99% of winter sightings of marked RMP Trumpeters have occurred within the Tristate area. No recurring use of winter sites outside of this area has been documented (Gale *et al.* 1987).

U. S. Fish and Wildlife Service (USFWS) Midwinter Trumpeter Swan Surveys show that due to growth of the ICSP, Trumpeters wintering in the Tristate area increased from 600+ in 1972-73 to 2000+ in 1989-90, while the TSP remained relatively static (537 in 1973 vs. 579 in 1990). Growth of Canadian flocks resulted in record concentrations of swans in the vicinity of Harriman State Park (HSP) and Red Rock Lakes National Wildlife Refuge

(RRLNWR), with 60% of the RMP (1,202) wintering there in 1989-90. The single most important wintering site is HSP on the Henrys Fork of the Snake River, Idaho, where swans have increased from 250± in 1972-73 to 750± in 1989-90.

RRLNWR, 30 km northwest of HSP, has virtually no natural winter swan habitat and wintering birds are fed stored grain at two man-made ponds. From 1935-85, collar sightings revealed that swans wintering at RRLNWR were primarily local residents, and winter numbers usually remained below 300 (Gale *et al.* 1987).

Although some Canadian Trumpeters have wintered at RRLNWR since at least 1956, (Mackay 1957), increases in both neck band sightings and total swan numbers indicate that growing numbers of Canadian Trumpeters have used the RRLNWR feeding ponds since 1986-87. These migrants are present from November through March, with numbers increasing throughout the winter. Swans move between the refuge feeding ponds and ice free river sites in and near HSP.

The 1990-91 Contingency Plan to Reduce Potential for Mortality of Wintering RMP Trumpeters at Harriman State Park and Red Rock Lakes NWR was adopted by the Pacific Flyway Council in July 1990. This Plan recognized the extreme vulnerability of these swans due to increasing numbers and their dependency either upon the artificial feeding program at RRLNWR or the aquatic vegetation of the Henrys Fork River.

During winter 1989-90, record numbers of swans gathered at HSP and aquatic plants in the river suffered a major decline (estimated 78% reduction) from which they have not recovered (Vinson 1991). As vegetation became depleted at HSP by March 1990, over 800 Trumpeters gathered at the RRLNWR feeding ponds and consumed all remaining grain supplies. This late winter concentration of 800+ swans and other waterfowl created serious concerns regarding disease potential and the increasing dependency of Canadian Trumpeter Swans on the artificial feeding program.

The goal of the 1990-91 Contingency Plan was to reduce the potential for high mortality of Trumpeter Swans due to inadequate food resources, inadequate water flows and/or disease at HSP and RRLNWR. Accomplishment of this goal requires long-term, continuous reduction of winter waterfowl use at these sites. Efforts began in 1990-91 when 353 Trumpeters were trapped, collared and moved from RRLNWR/HSP to more southerly wintering sites (Drewien *et al.* 1992). This paper discusses the effectiveness of efforts to reduce the number of swans and other waterfowl wintering at HSP and to prevent a major influx of Canadian Trumpeters into the RRLNWR feed ponds (remove swans >250 in November and December).

METHODS

I coordinated monitoring which involved gathering collar sightings through the help of a network of observers from the USFWS, The Wildlife Research Institute (University of Idaho), Idaho Department of Parks and Recreation, Idaho Department of Fish and Game, Wyoming Department of Game and Fish, the U. S. Forest Service, the National Park Service, and several private citizens. Swan numbers, distribution and location of collared swans were assessed by aerial fixed wing and ground surveys. Surveys occurred at most traditional winter use sites in the Tristate Region.

RESULTS AND DISCUSSION

Waterfowl numbers and distribution in the RRLNWR/HSP vicinity

Survey data (Figure 1a) for the HSP area (Pinehaven to Box Canyon) are from aerial surveys flown between 11 November 1990 to 22 February 1991 and from ground surveys thereafter. Data from RRLNWR (Figure 1b) are maximum weekly ground counts at the feeding ponds, except for one aerial survey of the entire refuge and adjacent Elk Lake on 11 November 1990. The number of swans that would have wintered at each site if no trapping had occurred was estimated by adding the number of swans previously removed to the number counted.

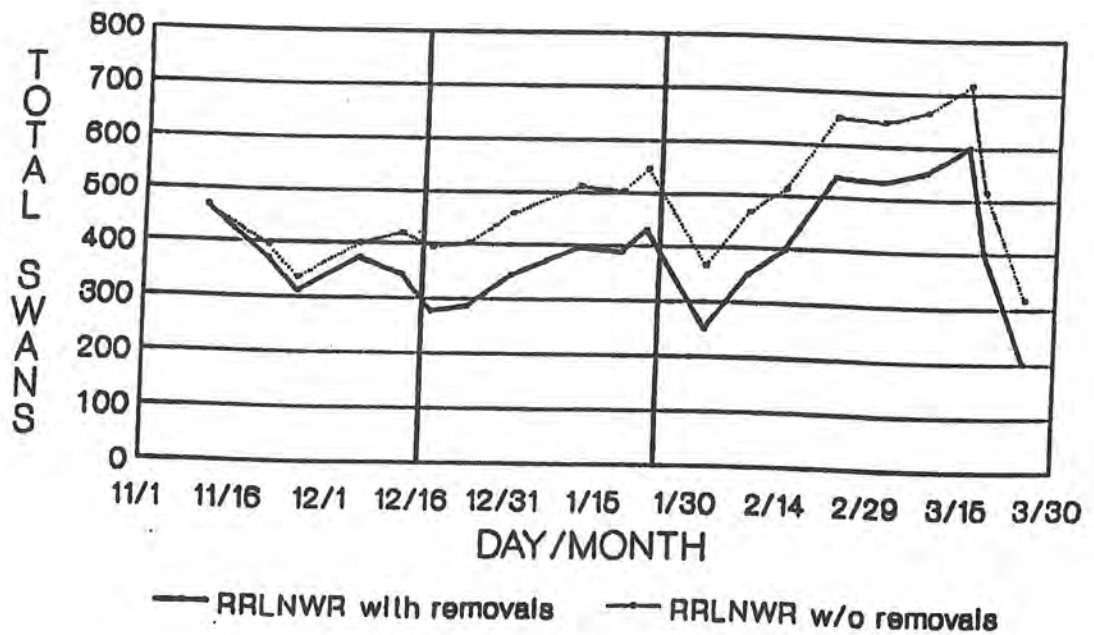
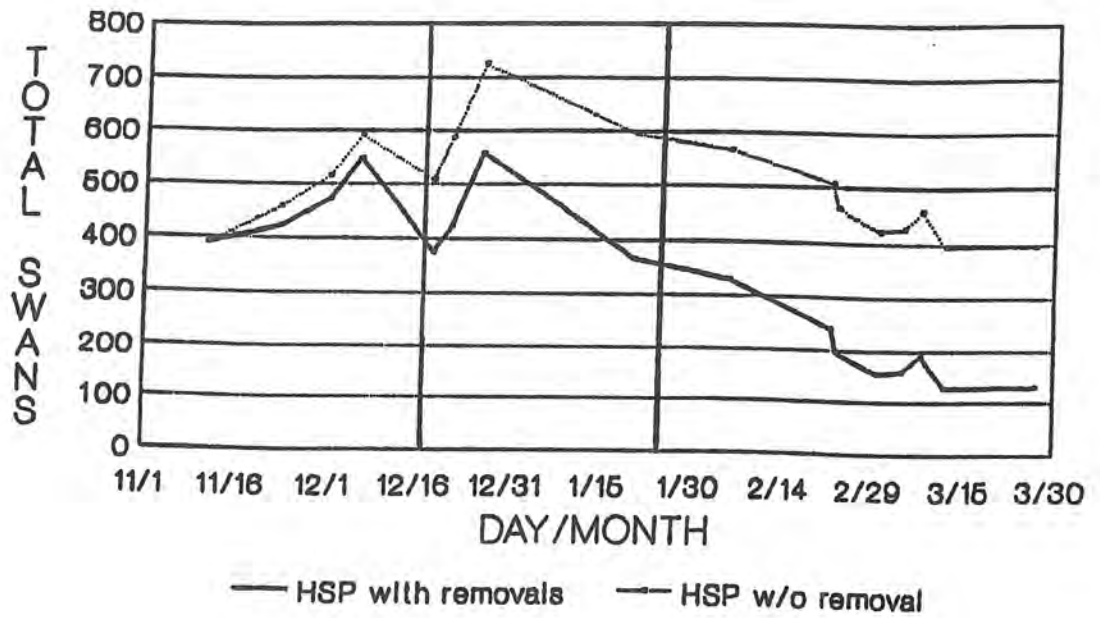


Figure 1a. Abundance of Trumpeter Swans, Winter 1990-91, at Harriman State Park, Idaho. (top)
 Figure 1b. Abundance of Trumpeter Swans, Winter 1990-91, at Red Rock Lakes National Wildlife Refuge, Montana. (bottom)

To analyze the response of swans to disturbance, I divided the winter into three survey periods which encompassed three very different scenarios of human disturbance at RRLNWR and HSP. The segments are:

- A. High Disturbance RRLNWR -
High Disturbance HSP
- B. Low Disturbance RRLNWR -
High Disturbance HSP
- C. Low Disturbance RRLNWR -
Low Disturbance HSP

Period A (11 November - 16 December 1990)

The aerial survey on 11 November showed unusually high numbers of Trumpeters had congregated at both at HSP (390) and RRLNWR (467). Canadian Trumpeters began arriving at RRLNWR at least by 7 November, when a collared swan was identified (Carl Mitchell, pers. comm.). This early influx of nonresident swans into RRLNWR continued the trend of increasing use that has become apparent since 1986-87 (Table 1) and demonstrated that many of the 800+ Trumpeters that utilized the refuge grain in March 1990 had returned.

During Period A, when both RRLNWR and HSP experienced unprecedented levels of disturbance, surveys (Figure 1b) showed movement of about 130 swans out of RRLNWR during and immediately after night lighting occurred in mid-November. This was followed by movement of about 80 swans into RRLNWR as disturbance lessened and grain was available at bait traps. Despite high disturbance, swan numbers increased at HSP throughout November and early December as new migrants arrived. Numbers then decreased during the night lighting "blitz" of 8-18 December 1990, when a net dispersal of about 90 swans occurred.

Period B (17 December 1990 - 23 January 1991)

Trapping ended at RRLNWR on 16 December and in subsequent weeks abundant grain was available and disturbance levels were low. An intense blizzard struck the region on 19-21 December. Intermittent high disturbance from

trapping attempts continued at HSP whenever weather permitted.

With the cessation of trapping at the feeding ponds, swans moved into the refuge as disturbance was maintained at HSP. Numbers at the ponds rose from 277 on 18 December to 430 by 22 January. This second influx brought a net gain of about 150 swans (54% increase) into RRLNWR during Period B, continuing the trend that began around 26 November after night lighting terminated.

At HSP, numbers peaked at 558 on 26 December after the blizzard subsided and swans arrived from Yellowstone Lake and other ice-locked areas (Table 2). Most habitat at HSP and elsewhere in Island Park was frozen but gradually reopened in early January. Subsequent trapping removed 103 swans and disturbance was very high; about 90 other swans dispersed by 20 January when 367 were counted.

Period C (24 January - 31 March 1991)

Approximately 180 swans left RRLNWR within a week after disturbance ended at HSP (Figure 1b). Numbers at the refuge then increased throughout February to peak at 600+ on 15 March.

Maximum daily temperatures in January and February were unusually mild. During this period swans steadily declined at HSP (Figure 1a). After mid-February most use at HSP was concentrated on Silver Lake which thawed unusually early and provided a new food source. Less than 50 swans remained on the river at HSP after 22 February, except for a few days when Silver Lake refroze in early March.

Dispersal of swans from the HSP/RRLNWR vicinity

Collared swans continued to arrive at HSP until at least the first week of January. However, of 56 collared Canadian swans observed in the Tristate area during the winter, eight dispersed from the HSP/RRLNWR area during November and December. Assuming that the Interior Canadian Subpopulation contains 1800+ swans

Table 1. September counts of Centennial Valley (CV), Montana, Trumpeter Swan flock and maximum monthly counts at the Red Rock Lakes NWR (RRLNWR) feeding ponds, winters 1981-82 through 1990-91^a.

Year	September CV Flock	Maximum monthly counts at RRLNWR feeding ponds				
	Total	Nov	Dec	Jan	Feb	Mar
1981-82	337	396	329	294	321	282
1982-83	no count	191	187	188	244	252
1983-84	249	229	188	265	214	271
1984-85	262	221	234	244	267	272
<u>1985-86</u>	<u>280</u>	<u>232</u>	<u>222</u>	<u>241</u>	<u>263</u>	<u>269</u>
5 year \bar{X}	282	254	232	246	262	269
1986-87	195	255	366	325	318	267
1987-88	335	156	355	508	466	300 ^b
1988-89	328	no count	369	400	426	400
1989-90	308	288	390	396	510	800±
<u>1990-91</u>	<u>345</u>	<u>467</u>	<u>373</u>	<u>430</u>	<u>537</u>	<u>600</u>
5 year \bar{X}	302	292	371	412	451	473

^a Data are from USFWS Tristate September Trumpeter Swan Surveys, Gale *et al.* (1987), and RRLNWR files.

^b Counts of 490 on 4 March 1988 and 595 on 14 March 1988 were not included due to presence of Tundra Swans.

(Len Shandruk, pers. comm.) these eight marked swans represent about 250 unmarked Trumpeters that dispersed from RRLNWR/HSP during these months. By 22 February, aerial surveys showed that an additional 150 swans had dispersed from the area since 26 December. In total, some 400 Trumpeter Swans left the RRLNWR/HSP area.

Approximately 1,000 swans remained in the area on 26 December despite high levels of disturbance. Including 287 swans that had been trapped before 26 December, and some 250 that had dispersed, I estimated 540+ swans were displaced from the HSP/RRLNWR vicinity by that date. Thus, approximately 1,500 Trumpeter Swans would likely have occupied the HSP/RRLNWR vicinity by year's end if contingency actions had not occurred. This represents an increase of 25% from the

1,197 swans in the area in February 1990, and coincides with an estimated 20% cygnets (1,200 adults and 300 cygnets) observed during autumn.

Net impacts of trapping and hazing on swan abundance at HSP/RRLNWR

A total of 844 swans was found in the area on 22 February 1991 after contingency actions ceased and swans began returning from downstream sites on the Snake River. This total represents a reduction of 44% from the 1,500 swans that returned to RRLNWR/HSP in autumn 1990, and a 30% reduction in swans compared to 20 February 1990 (Table 3).

Overall, efforts to disperse swans from HSP were highly effective, resulting in a 71% decrease by 22 February, compared to the

Table 2. Swan surveys in Island Park, Idaho, and Red Rock Lakes NWR, Montana, 11 November 1990 - 22 February 1991.

Date	Harriman State Park Pinehaven to Dam	Other Island Park	RRLNWR	Total
11 November	390	109	467	966
23 November	422	103	371	896
06 December	548	162	373	1083
18 December	375	191	277	843
21 December	420	363	238	1021
26 December	558	158 ^a	256	972+
20 January	367	164	430	961
05 February	330	134	322	786
22 February	240	67	537	844

^a Sheridan and Island Park Reservoirs not surveyed due to high winds

Table 3. Comparison of Trumpeter Swan abundance at and near Harriman State Park, Idaho, and Red Rock Lakes NWR, Montana, on 20 February 1990 and 22 February 1991.

Location	20 Feb. 1990	22 Feb. 1991	Change	
			Swans	%
Harriman State Park (Henrys Fork and lakes)	679	195	-484	-71%
Henrys Fork River from dam to Pinehaven	666	240	-426	-64%
All of Island Park	895	307	-588	-66%
Red Rock Lakes NWR	307	537	+230	+75%
Total Island Park/ Red Rock Lakes NWR	1202	844	-358	-30%

previous winter. Efforts to disperse swans from the entire RRLNWR/HSP vicinity were considerably less effective, however, due to a 25% increase in swans returning to the area and earlier and increasing use of the refuge feeding ponds by Canadian swans. Compared to the previous winter, the net reduction in swans wintering in the entire area (358) in

1991 was equivalent to the number removed by trapping (353). Even though several hundred additional swans dispersed from the area in response to disturbance, net reductions due to this dispersal were effectively negated by the annual population increase.

A major reduction of use by other waterfowl at HSP also resulted. A survey on 13 February 1991 found 83 geese and 1,593 ducks, compared to 1,200 geese and 3,600 ducks counted on 5 January 1990. This reduction in swan and other waterfowl use at HSP was accompanied, however, by movement of swans to the artificial feeding program at RRLNWR. After removal of 353 swans from the RRLNWR/HSP vicinity, peak numbers at RRLNWR were approximately 200 less in March 1991 compared to March 1990. In 1991, however, the late winter influx of swans occurred several weeks earlier than in 1990, and by 22 February there was a 75% increase at the feed ponds compared to the previous year. The availability of grain at RRLNWR decreased the effectiveness of the efforts to disperse swans, resulting in a 30% decline of swans in the total area as compared to a 71% decline at HSP.

Monitoring showed that trapping and hazing effectively dispersed waterfowl from HSP, but increasing numbers moved to RRLNWR because grain was provided. It was not possible to provide grain to local resident swans without attracting migrants. Record numbers of swans appeared at the feeding ponds in November and gathered again by late February despite unprecedented trapping and disturbance. A long-term reduction in waterfowl use at HSP is unlikely unless high levels of disturbance are maintained annually. Long-term reduction of wintering swans in the RRLNWR/HSP vicinity is unlikely unless Canadian Trumpeters are aggressively excluded from the artificial feeding program at RRLNWR.

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