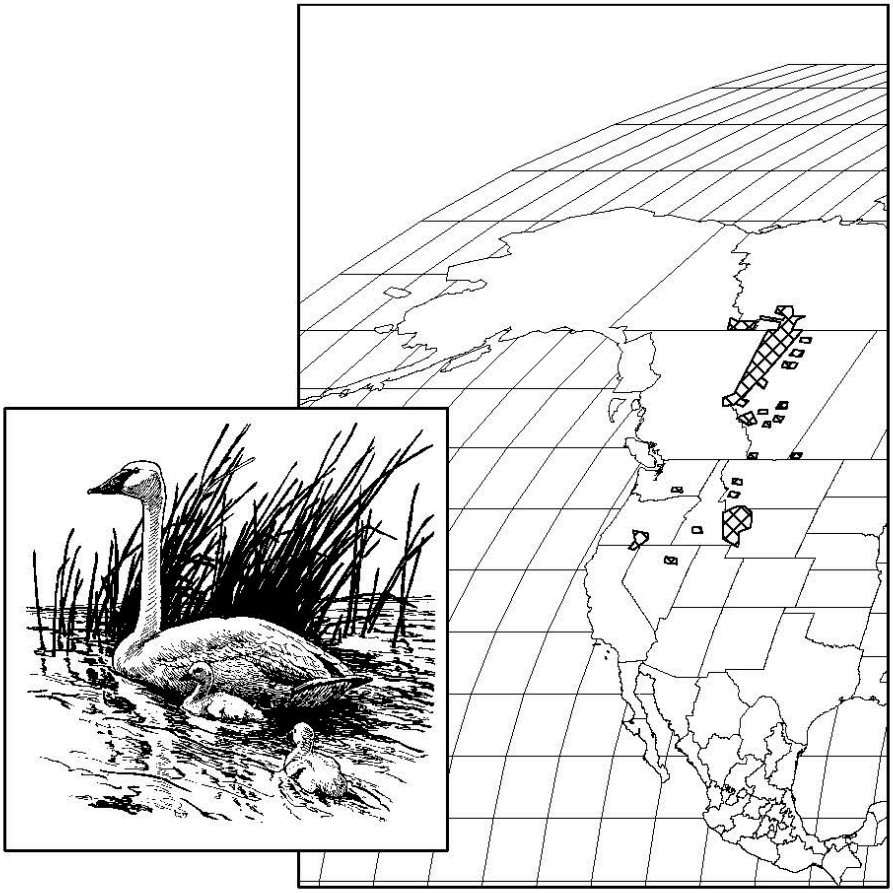
March 2016

Rocky Mountain Population of Trumpeter Swans

Pacific Flyway Management Plan for the

Rocky Mountain Population of Trumpeter Swans



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PACIFIC FLYWAY MANAGEMENT PLAN FOR THE

ROCKY MOUNTAIN POPULATION OF TRUMPETER SWANS

Prepared for the

Pacific Flyway Council
U.S. Fish and Wildlife Service
Canadian Wildlife Service

By the

Subcommittee on the Rocky Mountain Population of
Trumpeter Swans
Pacific Flyway Study Committee

Approved by: _____ July 2012
Chairman, Pacific Flyway Council **Date**

July 1992
Revised July 1998
Revised July 2008
Revised July 2012

ACKNOWLEDGMENTS

Although this plan was prepared by the Pacific Flyway Subcommittee for the Rocky Mountain Population of Trumpeter Swans, it received considerable input and assistance from many state, federal, and tribal agencies, nongovernmental organizations, and individuals. Agencies that provided input include the state fish and wildlife agencies of Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming, the Fish and Wildlife Division of Alberta Sustainable Resource Development, Wildlife Science Section of the British Columbia Ministry of Environment, the U.S. Fish and Wildlife Service, the Canadian Wildlife Service, Yellowstone National Park and the Confederated Salish and Kootenai Tribes, and the Wyoming Wetland Society. John Cornely of The Trumpeter Swan Society prepared and edited this revision of the plan and the Society provided input and significant support.

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PREFACE

Trumpeter swans (*Cygnus buccinator*) are native only to North America. Although no historical estimates of their abundance are available, by 1900 they had been eliminated from most of their historical range in the U.S. and Canada. Through habitat conservation, protection from illegal shooting, supplemental winter feeding, and re-introduction and translocation efforts, trumpeter swans have increased from a few hundred birds to nearly 35,000. To facilitate monitoring and management, the U.S. Fish and Wildlife Service (FWS) and Canadian Wildlife Service (CWS) designated three populations: the Pacific Coast (PCP), the Rocky Mountain (RMP), and Interior (IP). The Rocky Mountain Population (RMP) increased from less than 200 in the early 1930s to 4,701 in February 2007. Even though distribution patterns have changed since the late 1980s, about 80% of the population (n=4,449/5,484 in winter 2006) continues to winter in the core Tri-state Area of southeast Idaho, southwest Montana, and northwest Wyoming. This restricted winter range distribution is still a priority concern for the RMP, although there has been a gradual shift to the southern half of the core tri-state area and sites further south since hazing and winter translocations began at Harriman State Park (HSP) and Red Rock Lakes National Wildlife Refuge (NWR) in 1990 (Shea and Drewien 1999). Coincident with summer releases of captive-raised swans in Wyoming (1994-2002) and at Bear Lake in Idaho (2001-2004), and winter translocations in Idaho (2001-2004), an increasing percentage of swans have wintered south of the core Tri-state Area in the Green, Salt, and Bear River drainages of Idaho and Wyoming. In the winter of 2007, 34% (n=351/1,024) of swans in Wyoming and 23% in Idaho (n=696/3,080) were south of the core area (data from U.S. Fish and Wildlife Service 2007). A small number of swans have been reported from Utah, Colorado, Nevada, Arizona, and California as well.

The RMP is comprised of two important breeding groups, a relatively sedentary U.S. segment and a migratory segment from interior Canada. In addition, a few very small groups of breeding swans established outside of primary nesting and wintering areas by transplanting birds of RMP stock are included because of their ancestry. By the late 1980s, the increasing number of Canadian swans was clearly exceeding the carrying capacity of aquatic habitats on the Henry's Fork of the Snake River in and near Harriman State Park (HSP), Idaho. Over-winter foraging by swans and other waterfowl, in combination with low river flows and extensive ice formation, significantly reduced the submerged macrophyte plant communities in HSP and vicinity. Although swan winter distribution has expanded in recent years, available habitat in Idaho, Montana, and Wyoming is far from optimal due to high elevations, short growing seasons, and extended periods of sub-zero temperatures.

Also in the 1980s, increasing numbers of migrant Canadian swans were wintering at Red Rock Lakes National Wildlife Refuge (RRL NWR), 20 miles northwest of HSP in the Centennial Valley of Montana. Little natural winter habitat exists in the Centennial Valley; a supplemental feeding program, initiated in the 1930s, had sustained a nesting flock that grew to over 400 by the 1950s. The utility of this feeding program was questioned because it served to attract an increasing number of Canadian migrants to winter with the relatively sedentary Centennial Valley swans on an extremely limited habitat base.

Aggressive winter trapping and hazing efforts began in 1990-1991 to disperse swans from HSP/RRL NWR to: (1) reduce the potential for high winter mortality from disease or starvation; (2) prevent further damage to aquatic vegetation and fish habitat at HSP; and (3) force RMP swans to use other more suitable winter habitats, broaden their wintering and nesting distribution, and increase population

security. Feeding at RRL NWR was phased out and, finally, terminated in the winter of 1992-1993 to further discourage birds from wintering on the refuge. The number of breeding swans in the core Tri-state Area declined sharply between the winter of 1992 and the fall of 1993, presumably as a result of a combination of factors including the termination of winter feeding, a very severe winter, the deliberate summer translocation of resident swans out of the Centennial Valley, and the disruptive nature of several years of winter trapping and hazing efforts.

Although a slowly increasing percentage of RMP swans are using new wintering areas and migration routes and U.S. swans have established several new breeding areas, growing numbers of Canadian swans continue to return each autumn to winter in the core Tri-state Area. Increased numbers of wintering swans not only increase the competition for limited winter habitat, but likely also impact the spring and summer habitat important for the swans that breed in the core Tri-state Area. In addition, the area has experienced prolonged drought conditions and increased human development and recreation. The continued growth of the Canadian flocks and the ability of the U.S. flocks to achieve breeding pair objectives could be jeopardized if increasing numbers of swans continue to winter in restricted habitat.

The goal of this management plan is to restore the RMP as a secure and primarily migratory population, sustained by naturally-occurring and agricultural food resources in diverse breeding and wintering sites. Management objectives are: (1) continue to encourage swans to use wintering areas outside of the core Tri-state Area while reducing the number of wintering swans in the core Tri-state Area to a maximum of 1,500; (2) rebuild U.S. nesting flocks by year 2013 to at least 165 nesting pairs (birds that display evidence of nesting) and 718 adults and subadults (white birds) that use natural, diverse habitats; (3) expand the breeding range in order to enhance the connectivity of breeding flocks; (4) increase the abundance of desirable submerged macrophytes in the Henry's Fork of the Snake River in and near HSP; (5) promote the restoration and development of high quality wetland habitats for breeding and wintering swans; and (6) monitor the population.

Important management strategies to achieve the objectives include: (1) reduce the attractiveness of HSP by manipulating water levels; (2) provide habitat to attain population objectives; (3) identify potential breeding and winter expansion areas; (4) evaluate the effectiveness of raising cygnets from eggs collected in Canada to increase the availability of swans for release and to increase genetic heterozygosity; (5) identify, fund, and implement new wetland projects; (6) translocate flightless U.S. and Canadian cygnets as appropriate; (7) continue to monitor submerged macrophytes in the Henry's Fork of the Snake River; (8) develop and implement an effective public information program; and (9) maintain trumpeter-swan-compatible, tundra swan sport hunting opportunities in the Pacific Flyway.

The Subcommittee is uncertain where swans will choose to winter outside of the core Tri-state Area, although southern Idaho, northern Utah, Nevada, California, Arizona, and Colorado are possibilities.

The ability to accurately monitor the entire RMP is increasingly difficult in Canada and the U.S., because birds are dispersing to new sites scattered across their nesting and wintering ranges and agency budgets have not kept pace with growing survey costs. During the period this plan is in effect, monitoring of the population will continue to be a high priority to ascertain whether the goal and objectives of this plan are being achieved. The monitoring effort will be coordinated by the FWS in cooperation with state fish and wildlife agencies and the assistance of other partners.

Monitoring data from the fall and winter surveys will be maintained in a central file by the FWS, Regional Division of Migratory Bird Coordination (DMBC), Lakewood, CO. A brief annual progress report will be submitted to the Pacific Flyway Council by the Chair of the RMP Trumpeter Swan Subcommittee. At 5-year intervals (2013, 2018, 2023) the FWS will analyze all available data following the release of the most recent quinquennial range-wide survey report and prepare a progress report on the status of the RMP including an assessment on progress made toward achieving this plan's goal and objectives

PACIFIC FLYWAY MANAGEMENT PLAN FOR THE

ROCKY MOUNTAIN POPULATION OF TRUMPETER SWANS

INTRODUCTION

Terminology

In this plan, the **Tri-state Area** refers to the entire state of Idaho, and the portions of Montana, and Wyoming within the Pacific Flyway. The **Core Tri-state Area** refers to the entire Island Park region, Teton River drainage, Teton Basin, Henry's and South Forks of the Snake River, and Camas NWR of Idaho; Red Rock Lakes National Wildlife Refuge (RRL NWR), Centennial Valley, Hebgen Lake, and Madison River and tributaries of Montana, and Yellowstone National Park, Grand Teton National Park and the Snake River drainage in Wyoming including the Jackson Hole area south to Alpine (Fig. 1). RMP trumpeters that summer in the U.S. are referred to as the **RMP/U.S. Breeding Segment**. **RMP/Tri-state Area Flocks** refers specifically to swans that summer in the core Tri-state Area. **RMP/Canadian Flocks** refers to trumpeters that summer primarily in Canada in southeastern Yukon Territory, southwestern Northwest Territories, northeastern British Columbia, Alberta, and western Saskatchewan, and winter in the U.S. **Restoration Flocks** refers to swans introduced to Ruby Lake NWR, Nevada; Malheur NWR, Oregon; Summer Lake Wildlife Management Area (WMA), Oregon, and the Flathead Indian Reservation, Montana.

Introduction

The first management plan for the RMP was included as part of The North American Management Plan for Trumpeter Swans approved by the Pacific Flyway Council in 1984 (U.S. Fish and Wildlife Service 1984). The RMP information in that plan became the basis for a stand-alone Pacific Flyway Plan approved in 1992. The 1992 plan (Subcommittee on Rocky Mountain Trumpeter Swans 1992) focused on the need to: (1) restore the RMP as a secure and primarily migratory population sustained by naturally-occurring food sources in diverse breeding and wintering sites; (2) develop a wintering population of at least 2,200 swans, distributed within the natural carrying capacity of the core Tri-state Area (Fig. 1) and at least four additional wintering areas, without use of supplemental feeding; and (3) develop a dispersed breeding population of at least 355 nesting pairs throughout their nesting range, all capable of moving to suitable natural wintering habitats, while maintaining viable flocks in all currently-occupied breeding areas.

The 1992 plan included the actions and resources necessary to: (1) disperse approximately 1,100 swans to winter habitats outside the core Tri-state Area; (2) reduce the number wintering inside the core Tri-state Area to 1,100, including virtually none at RRL NWR, southwest Montana; 300 in the HSP/Island Park area, southeast Idaho; 250 in the Jackson Hole/Salt River area, Wyoming; 120 in Yellowstone National Park; 300 on the lower Henry's Fork of the Snake River/Teton River/South Fork of the Snake River area, southeast Idaho; and 130 at other sites; (3) reduce ducks and geese at HSP and maintain winter swan numbers at approximately 200 from Box Canyon to Pinehaven; and (4) encourage the Centennial Valley, Montana, breeding flock to migrate to suitable natural winter habitat.

The 1992 plan recognized that, as trumpeter swans dispersed to long-vacant habitats, conflicts with management of other waterfowl species, particularly hunting of tundra swans, likely would occur. Consequently, ensuing management actions were designed to restore a secure RMP while minimizing conflicts with other waterfowl management objectives.

The 1998 revision of the RMP plan sought to build on the progress made during prior years, particularly the apparent progress made during the 1996-1997 winter when a major shift in winter distribution was observed. This southerly shift resulted in only about 200 swans wintering at HSP and 65% of the total population wintering south of Island Park and Yellowstone National Park. This southward shift has continued, but since 1996 the number of swans wintering in the Tri-state area has more than doubled. Winter surveys in 2006-2007 indicated distribution changes that suggest winter areas for small groups of swans on the Snake River as far downstream as CJ Strike Reservoir in Idaho, at Silver Creek in south-central Idaho, the Bear River Drainage in southeastern Idaho and northeastern Utah, and the Green River below Flaming Gorge Reservoir in Wyoming.

In 2002 a Pacific Flyway Trumpeter Swan Implementation Plan (TSIP) was completed and approved by the Council. The TSIP was the result of a collaborative effort among federal, state, and nongovernmental organizations and assigned specific tasks and time frames to implement the strategies listed in the 1998 revision of the RMP plan. The TSIP was tiered to the 1998 RMP plan, contained updated objectives, strategies and tasks for the five year period 2002-2007.

This 2008 revision of the RMP plan updates the 1998 plan and the 2002 TSIP and combines them into one document. A summary of major changes made in this plan from the 1998 revision appear in Appendix 9.

Background

Trumpeter swans once ranged across North America from the Atlantic to the Pacific. Fur traders and homesteaders eliminated the species from most of its ancestral range by 1900. Some trumpeters survived in Canada and the U.S. Territory of Alaska. The only surviving flocks in the United States wintered in the core Tri-state Area. Protected by the region's remoteness, these birds survived in isolated sites where geothermal runoff created small ice-free areas regardless of winter severity (Banko 1960). In 1933, this wintering remnant included about 70 resident swans and a similar number that migrated to Canadian nesting sites. Migrations to wintering areas outside of the core Tri-state Area apparently ceased as all other flocks were extirpated (Gale et al. 1987). Presumably pioneering birds that left the core area were at much higher risk. The U.S. nesting swans that survived are the ancestors of today's more sedentary U.S. flocks, which together with the Canadian flocks comprise the RMP. Trumpeters that nest primarily in Alaska and winter south to western Oregon comprise the Pacific Coast Population (Fig. 2). Concern about the status of trumpeter swans led to substantial conservation efforts that included land acquisition, supplemental feeding, closed hunting seasons, law enforcement, public education, translocations, and the release of genetically suitable captive-reared swans.

RRL NWR was established in 1935 to protect important nesting habitat in the Centennial Valley of Montana for trumpeter swans and other waterfowl. From 1935 through the winter of 1992-1993, supplemental feeding enabled trumpeters to winter at RRL NWR despite the absence of natural winter habitat. By providing grain, managers probably contributed to minimizing migration to wintering sites

in eastern Idaho and elsewhere where mortality from illegal shooting was feared (Banko 1960). The number of swans in the Centennial Valley increased and approached 600 birds in some years. Over 530 swans from this area were provided for restoration efforts in other States from 1938-1983 (Gale et al. 1987). Swans from RRL NWR were used to establish new breeding flocks at several National Wildlife Refuges and other sites. Translocation efforts were accelerated during the late 1980s and early 1990s as attempts were made to disperse an increasing number of wintering swans from RRL NWR and HSP and relieve pressure on winter habitats.

In addition to supplemental feeding at RRL NWR, the establishment of a wildlife sanctuary by Idaho State law at HSP and creation of ice-free habitat below dams built in the 1920s and 1930s on the Henry's Fork of the Snake River increased the core Tri-state Area's winter carrying capacity for swans and, perhaps, discouraged them from migrating to habitats farther south. In response, swans wintering in the core Tri-state Area increased from about 150-200 in the early 1930s to 2,709 by 1996; numbers declined to 2,586 in 1997 and to 2,063 in 1998, as measured by the Midwinter Trumpeter Swan Survey (Appendix 1). Since then the number has increased to a record high of 4,701 in 2007.

The Pacific Flyway Council believes that supplemental feeding of RMP trumpeter swans should not be considered a viable management alternative. In Addition, FWS policy discourages supplemental feeding. Supplemental feeding, of any kind and at any time and location, is considered counter to the goal and objectives of this plan.

After peaking in the 1950s and 1960s at approximately 550, core Tri-state Area adults and subadults counted during the Fall Survey declined by 40% to a 36-year low of 331 in 1986 (Appendix 2). This decline centered at RRL NWR and was accompanied by a decline in nesting swans in Yellowstone National Park. This declining adult component, accompanied by very low cygnet production, caused the FWS and the Pacific Flyway to initiate a 3-year study of the causes and potential remedies (Gale et al. 1987). Recommended management changes were implemented and by 1989 core Tri-state Area adults once again exceeded 500 (Appendix 2). Since 1989, although productivity has averaged 20%, the core Tri-state Area flocks has declined. Reasons for the declines are unknown but they occurred at a time when a large number of birds were translocated to alternate habitat areas and feeding was terminated at RRL NWR (1992-1993). Possibly the combination of these factors and winter waterfowl numbers that may have exceeded the carrying capacity of the habitat available in the Tri-State Area may have led to increased winter mortality during this period although no consistent monitoring program to assess winter mortality has been in place (Appendix 2). The 40-year trend of all U.S. flocks counted during Fall appears in Figure 7. The number of birds in Canadian flocks have continued to expand and in 2006 comprised approximately 91% of the total RMP (Figs. 16). This compares to 83% in 1997 when the last revision of this plan was prepared.

Conservation efforts have enabled the RMP to increase 10-fold and expand the breeding distribution of the Canadian flocks. Despite this growth, RMP swans have not significantly increased their dispersal to winter habitats outside of the core Tri-state Area.

A range-wide genetics survey of trumpeter swans completed in 2006 (Oyler-McCance et al. 2006) indicated that the PCP and RMP had dissimilar haplotypes indicating genetic distinctness. However, the Tri-state Area flocks and RMP/Canadian flocks are not significantly different genetically. The study results suggest that trumpeter swans have a much lower mitochondrial DNA variability than other

waterfowl studied to date. The results further suggest that trumpeters experienced a species-wide bottleneck well before the more recent one that occurred in the 20th Century. Samples analyzed from the area where PCP and RMP trumpeter breeding ranges are converging (western Yukon Territory) indicated that some genetic exchange has occurred between the populations in that area.

GOAL AND OBJECTIVES

Population Management Goal

The management goal is to restore the RMP as a secure and primarily migratory population, with a 5% average annual growth in numbers of wintering birds, sustained by naturally-occurring and agricultural food resources in diverse breeding and wintering sites with a long range goal of achieving connectivity between flocks. The annual growth rate was 5.4 % for the period 1968-2005 for the entire RMP and 7.4% from 2000-2005 for the RMP/Canadian Flocks.

Objectives

A. Expand distribution of wintering swans to areas outside of the core Tri-state Area, while maintaining the habitat quantity and quality in traditional core areas and redistribution of swans breeding at Malheur NWR, Oregon, to more appropriate wintering areas than the Harney Basin.

The Subcommittee is uncertain where swans will choose to winter outside of the core Tri-state Area. Some swans are wintering in southern Idaho and southwestern Wyoming. Other potential areas may include Montana, northern Utah, northern Nevada, California, Arizona, and Colorado. Although highly variable, the most suitable habitats for wintering significant numbers of trumpeter swans are located in southern Idaho, northern Utah, northern Nevada, and California. This conclusion is based on the historical use of these areas by trumpeter swans and the current pattern of use by tundra swans (Banko 1960; Behle et al. 1985; Dalton et al. 1990; Gale et al. 1987; Pacific Flyway Council 1997; Parmalee 1980; Ryser 1985; Woodbury et al. 1949) (Appendix 8). Southern Idaho, northern Utah, and northern Nevada also appear to have significant amounts of spring and fall migration stop-over habitat.

Strategy 1. Encourage swans to migrate to wintering areas outside of the Core Tri-State Area, especially outside of HSP.

Task 1. Monitor waterfowl use of HSP and other concentration areas on a routine basis during fall and winter months.

- Lead Agencies: Idaho Department of Fish and Game
- Participating: Idaho Department of Parks and Recreation, USFWS
- Priority: 1
- Schedule: Annual

Task 2. Continue to maintain reduced fall and early winter swan habitat on HSP by manipulating water levels while giving consideration to fisheries, irrigation, and hydropower concerns. Manage water levels of Silver and Golden Lakes to encourage early freezing and reduce

the availability of feeding and resting sites. Refill both by March 1 to maximize late-winter foraging habitat.

- Lead Agencies: Idaho Department of Parks and Recreation
- Participating:
- Priority: 1
- Schedule: Annually

Task 3. Encourage the U. S. Bureau of Reclamation (BOR) to maintain lower flows on the Upper Henry's Fork in the fall to reduce habitat available for migrating swans and to store water for emergency mid-winter releases. (See also Objective D).

- Lead Agencies: Idaho Department of Fish and Game
- Participating: Bureau of Reclamation
- Priority: 1
- Schedule: Annually

Task 4. Encourage landowners in the core Tri-state Area to allow shallow water wetlands to freeze in the fall by not using artificial means to keep wetlands open. This would encourage swans to move to other areas.

- Lead Agencies: Wyoming Game and Fish Department; Idaho Department of Fish and Game; Montana Department of Fish; Wildlife and Parks; USFWS
- Participating:
- Priority: 2
- Schedule: Ongoing

Strategy 2. Work with partners to protect, enhance and increase trumpeter swan winter habitat.

Task 1. Identify and prioritize additional areas outside the core Tri-state Area with suitable habitat to support wintering trumpeter swans.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; Wyoming Game and Fish Department
- Participating: The Trumpeter Swan Society, Intermountain West Joint Venture
- Priority: 1
- Schedule: Ongoing

Task 2. Identify and prioritize winter habitat restoration, acquisition and enhancement projects by state and display the results in a landscape swan habitat atlas.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; Wyoming Game and Fish Department
- Participating: The Trumpeter Swan Society, Intermountain West Joint Venture
- Priority: 1
- Schedule: Ongoing

Task 3. Identify and address specific factors limiting swan use of winter habitats, including disturbance and site specific mortality factors; such as powerlines, lead poisoning, fences, etc.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; Wyoming Game and Fish Department
- Participating: The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

Task 4. Work with partners to secure funding for high priority habitat projects.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; Wyoming Game and Fish Department
- Participating: Intermountain West Joint Venture, The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

Task 5. Continue to monitor and evaluate the success of past swan translocations in Oregon, Idaho, and Wyoming toward achieving Objectives 1 and 2. Monitor, evaluate and prioritize introductions in the Flathead and Blackfoot valleys in Montana.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; Wyoming Game and Fish Department
- Participating: Confederated Salish and Kootenai Tribes, Blackfoot Challenge
- Priority: 1
- Schedule: Ongoing

B. Rebuild U.S. breeding flocks by year 2013 to at least 165 nesting pairs (718 adults and subadults) that use natural, diverse habitats as follows:

Location	Nesting pairs[a]	Adults and subadults[b]
Montana		
Centennial Valley	19	140
Madison, Paradise	15	65
Blackfoot, East Front	10	25
Flathead Drainage	15	60
Total	59	290
Wyoming		
Yellowstone National Park	10	40
Snake River core	18	60
Green River	16	53
Salt River	2	7
Total	46	160
Idaho		
Island Park	10	60
Henry's Fork Drainage	6	30
Teton Basin	2	10
Fort Hall Bottoms	3	15
Bear Lake NWR	5	25
Grays Lake NWR	10	30
Camas County	1	5

Location	Nesting pairs[a]	Adults and subadults[b]
Total	37	175
Oregon		
Malheur NWR/Harney County	5	25
Central Oregon	10	50
Total	15	75
Nevada		
Ruby Lake NWR	8	18
Total	8	18
Grand Total	165	718

[a] The criterion nesting pair is defined as a swan pair that is displaying evidence of nesting (e.g., nest building, incubation, brooding posture, visible eggs); it may require on-the-ground verification. It provides more accurate information on reproductive activity than does breeding pairs, but it may not always be available because of the need for verification.

[b] White birds only, counted during the Fall Survey of the RMP/U.S. Breeding Segment.

Strategy 1. Increase the size and productivity of the Tri-state Area Flocks by providing adequate nesting, brood rearing, spring transitional habitats for breeding pairs, and summer habitat for subadults.

Task 1. Work cooperatively with all U.S. partners to standardize habitat evaluation procedures.

- Lead Agencies: Greater Yellowstone Trumpeter Swan Working
- Participating: USFWS; Wyoming Game and Fish Department Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; US Forest Service; National Park Service; The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

Task 2. Update current and potential pre-breeding and nesting habitat information and develop a state-by-state landscape-level planning strategy to facilitate prioritization and implementation of Strategy 1. The current priority Areas by State are:

Idaho: Gray's Lake NWR, Bear Lake NWR, Camas NWR, Chester Wetlands WMA, Mud lake WMA, Fort Hall Bottoms, Sand Creek WMA, Minidoka NWR, Kootenai NWR, Boundary Creek WMA, Teton Valley

Montana: Flathead Indian Reservation, Upper Blackfoot River Valley, Madison Valley, Bureau of Land Management (BLM) in the Centennial Valley

Oregon: Malheur NWR, Summer Lake WMA, Klamath Marsh, Agency Lake

Nevada: Ruby Lake NWR, Franklin Lake WMA, and assess other potential sites

Utah: Assess potential at Ouray NWR, Fish Springs NWR and other sites

Washington: Assess potential in Eastern Washington

Wyoming: Yellowstone National Park, Green River Basin including Seedskadee NWR, Jackson Hole including the National Elk Refuge and Grand Teton National Park, Salt River, Gros Ventre River, Hamm's Fork, Bear River and Cokeville Meadows NWR

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana, Department of Fish, Wildlife and Parks; Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Utah Division of Wildlife Resources; Washington Department of Fish and Wildlife; Wyoming Game and Fish Department
- Participating: National Park Service, US Forest Service, Bureau of Land Management, The Trumpeter Swan Society, Confederated Salish and Kootenai Tribes, Greater Yellowstone Trumpeter Swan Working Group.
- Priority: 1
- Schedule: Ongoing

Task 3. Identify and work with partners to fund high priority wetland development, restoration, and enhancement projects capable of providing nesting and brood- rearing habitat, or summer habitat for nonbreeding, subadult swans. This will be accomplished by State fish and game agencies and FWS working with the Intermountain West Joint Venture, Indian tribes, other agencies, local land trusts, other non-governmental organizations, and private landowners. Swan habitat needs will be highlighted in National Wildlife Refuge Comprehensive Management Plans.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana, Department of Fish, Wildlife and Parks; Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Utah Division of Wildlife Resources; Washington Department of Fish and Wildlife; Wyoming Game and Fish Department
- Participating: National Park Service, US Forest Service, Bureau of Land Management, The Trumpeter Swan Society, Confederated Salish and Kootenai Tribes, Intermountain West Joint Venture, Natural Resource Conservation Service, local land trusts
- Priority: 1
- Schedule: Ongoing

Task 4. Monitor human encroachment into nesting and brood rearing areas and develop solutions.

- Lead Agencies: USFWS; National Park Service; US Forest Service; Bureau of Land Management; Idaho Department of Fish and Game; Montana, Department of Fish, Wildlife and Parks; Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Wyoming Game and Fish Department
- Participating: Confederated Salish and Kootenai Tribes, The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

Task 5. Complete an in depth investigation at RRL NWR to determine reasons for the decline in nesting pairs to well below the historic average. Because historic averages may be biased high due to supplemental winter feeding, the current carrying capacity for breeding pairs

needs to be determined. In addition, the potential for breeding habitat restoration and enhancement needs to be determined.

- Lead Agencies: USFWS, US Geological Survey
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 6. Complete assessment of 77 years (1931-2007) of data on trumpeter swan abundance, habitat, use, and productivity, as well as, 20 years (1987-2006) of weekly winter survey transects along the Yellowstone and Madison rivers.

- Lead Agencies: National Park Service
- Participating:
- Priority: 1
- Schedule: 2008-2009.

Task 8. Convene a workshop and develop conservation measures to prevent extirpation of trumpeter swans from Yellowstone NP.

- Lead Agencies: NPS
- Participating: USFWS; Wyoming Game and Fish Department; Montana Department of Fish, Wildlife and Parks; Idaho Department of Fish and Game; The Trumpeter Swan Society, Greater Yellowstone Trumpeter Swan Working Group.
- Priority: 1
- Schedule: 2008-2009.

Strategy 2. Release captive-reared cygnets or yearlings of RMP origin during summer into suitable habitats (Appendix 3) to establish new breeding flocks that winter outside the core Tri-state Area while maintaining connectivity to established flocks. Captive-reared cygnets or yearlings of Pacific Coast Population origin may be used in the RMP area of Oregon and Washington for release sites approved through established flyway processes.

Task 1. Develop tools and a process to objectively prioritize areas with potential to support nesting pairs and broods for swan releases. Project proposals for suitable release areas will be reviewed by the RMP Trumpeter Swan Subcommittee and Waterfowl Study Committee for potential Council consideration (Appendix 11).

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife, and Parks; Wyoming Game and Fish Department
- Participating: Greater Yellowstone Trumpeter Swan Working Group
- Priority: 1
- Schedule: 2008-2010

Task 2. Annually review numbers of birds to be released in each state until the overall state objective for nesting pairs is reached. Continue to release birds in Council-approved projects in the Flathead and Blackfoot valleys of Montana, Fort Hall Bottoms, and other suitable areas (Appendix 11).

- Lead Agencies: Pacific Flyway RMP Trumpeter Swan Subcommittee

- Participating: Greater Yellowstone Trumpeter Swan Working Group
- Priority: 1
- Schedule: Ongoing

Task 3. Utilize eggs from RMP breeding swans collected in Alberta and British Columbia to supplement captive breeding stock. Augment productivity of wild nesting pairs at selected sites by inserting eggs near hatching or newly hatched cygnets into their nest to increase genetic heteozygosity.

- Lead Agencies: USFWS, Canadian Wildlife Service
- Participating: Wyoming Wetland Society, British Columbia Ministry of the Environment, Alberta Sustainable Resource Development
- Priority: 1
- Schedule: 2007-2009

Task 4. Continue to monitor for disease problems in swans and other waterfowl and ascertain the potential disease implications at potential release sites (Appendix 7).

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department, Oregon Department of Fish and Wildlife; Nevada Division of Wildlife
- Participating: Confederated Salish and Kootenai Tribes
- Priority: 1
- Schedule: Ongoing

Strategy 3. Maintain or enhance restoration flocks in Oregon and Nevada.

Task 1. In Oregon, resume releases of cygnets and subadults at Summer Lake WMA and other sites approved by the Pacific Flyway Council. Potential sources of birds include: (1) swans produced at Malheur NWR; (2) genetically appropriate birds produced by the captive flock in Bend, Oregon; (3) cygnets from other RMP stock areas; and (3) birds produced from eggs gathered in British Columbia and Alberta by the Wyoming Wetland Society. During summer molt, locate and move unpaired subadults found in Oregon to Summer Lake WMA

- Lead Agencies: Oregon Department of Fish and Wildlife, USFWS
- Participating: The Trumpeter Swan Society, Wyoming Wetland Society
- Priority: 1
- Schedule: 2008-2013

Task 2. Assess the potential for enhancement of the restoration flock at Ruby Lake NWR and the potential for establishment of additional nesting sites in Nevada. Determine the factors currently limiting production.

- Lead Agencies: USFWS, Nevada Department of Wildlife
- Participating:
- Priority: 2
- Schedule: 2008-2013

Strategy 4. Decrease mortality of RMP/US Breeding Flocks during the breeding season.

Task 1. Identify and reduce mortality sources including fences, powerlines, lead poisoning, other contaminants, and illegal shooting. Actions include law enforcement, public education, fence removal or relocation, powerline marking, and lead shot assessments of current and potential swan use areas.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department; Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Confederated Salish and Kotenai Tribes
- Participating: The Trumpeter Swan Society, Greater Yellowstone Trumpeter Swan Working Group
- Priority: 1
- Schedule: Ongoing

Task 2. Convert more fishing areas to the use of non-toxic sinkers and jig heads. Suitable non-toxic fishing tackle is available. Promote or require non-toxic fishing tackle where ever there is potential for swans to ingest tackle lost by anglers. RRL NWR and Yellowstone NP have had lead fishing tackle restrictions in place for a number of years.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department, Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Washington Department of Fish and Wildlife
- Participating: National Park Service, US Forest Service, Bureau of Land Management, Confederated Salish and Kootenai Tribes
- Priority: 1
- Schedule: Ongoing

C. On the Canadian breeding grounds, facilitate management and landscape-based conservation, based on principles of collaboration, stewardship, securement and sustainable development.

Task 1. Maintain 98 breeding pairs in Alberta, striving to achieve a well-distributed breeding range that demonstrates expansion relative to historic range.

- Lead Agencies: CWS, Alberta Sustainable Resource Development
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 2. Increase the number of breeding pairs in Elk Island National Park and vicinity to 10 by 2010.

- Lead Agencies: CWS, Elk Island National Park
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 3. Work with partners toward managing land use adjacent to nesting lakes to prevent or reduce human disturbance and enhance natural productivity.

- Lead Agencies: CWS, Alberta Sustainable Resource Development, British Columbia Ministry of Environment, Environment Yukon
- Participating: Ducks Unlimited Canada, The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

Task 4. Develop land use guidelines for privately owned land in Alberta and British Columbia to prevent or reduce conflicts between development and swan breeding habitat.

- Lead Agencies: CWS, Alberta Sustainable Resource Development, British Columbia Ministry of Environment
- Participating: Ducks Unlimited Canada
- Priority: 1
- Schedule: Ongoing

Task 5. Implement powerline mitigation initiatives at key sites in Alberta and British Columbia to reduce swan mortality.

- Lead Agencies: CWS, Alberta Sustainable Resource Development, British Columbia Ministry of Environment
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 6. Assess potential breeding sites across suitable breeding landscapes in northern Alberta in order to improve management for future breeding sites.

- Lead Agencies: CWS, Alberta Sustainable Resource Development
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 7. Increase the recognition that land use decisions in Canada have important international ramifications.

- Lead Agencies: Ducks Unlimited Canada
- Participating: CWS, Alberta Sustainable Resource Development, British Columbia Ministry of Environment, Environment Yukon
- Priority: 1
- Schedule: Ongoing

Task 8. Monitor the breeding and expansion of swans in the vicinity of Elk Island National Park, Alberta, as funding becomes available.

- Lead Agencies: CWS, Elk Island National Park
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 9. Complete the Alberta, British Columbia, Yukon Territory, and Northwest Territories portions of the quinquennial breeding survey in 2010 and expand the geographic range of these surveys.

- Lead Agencies: CWS, Alberta Sustainable Resource Development, British Columbia Ministry of Environment, Environment Yukon
- Participating:
- Priority: 1
- Schedule: 2010

D. Manage flows on the Henry's Fork of the Snake River to decrease winter use of the Upper Henry's Fork by swans, to address winter emergencies for swans due to icing, and to increase the abundance of desirable submerged macrophytes in and near HSP, Idaho.

Strategy 1. Continue to seek flow regimes for the Henry's Fork of the Snake River that will (1) provide higher winter flows without abrupt fluctuations (particularly when ice is present), (2) reduce the variation between winter and early spring peak flows while avoiding adverse impacts to fish and submerged macrophytes, and (3) avoid massive and abrupt releases of sediment from Island Park Reservoir.

Task 1. Work with the U. S. Bureau of Reclamation, Native American Tribes, Fremont-Madison Irrigation District, and the Henry's Fork Watershed Council to identify and acquire needed flows.

- Lead Agencies: Idaho Department of Fish and Game, USFWS
- Participating: Bureau of Reclamation, Fremont-Madison Irrigation District, Native American Tribes, and Henry's Fork Watershed Council
- Priority: 1
- Schedule: Annually

Strategy 2. Monitor submerged macrophytes.

Task 1. Conduct periodic surveys of the submerged macrophytes.

- Lead Agencies: Idaho Department of Fish and Game
- Participating:
- Priority: 2
- Schedule: Ongoing

E. Monitor the population during nesting, post-breeding and mid-winter periods.

Strategy 1. Continue existing monitoring programs to evaluate the status of the population and effectiveness of management actions.

Task 1. Obtain long-term commitment for survey funding from federal, state, provincial, and territorial resources agencies and their partners.

- Lead Agencies: Pacific Flyway Council, FWS, CWS

- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department; Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Confederated Salish and Kootenai Tribes; Alberta Sustainable Resource Development; British Columbia Ministry of Environment
- Priority: 1
- Schedule: Ongoing

Task 2. Conduct the RMP portion of the Continental Survey of breeding trumpeter swans at five year intervals and report the results within 9 months of the conclusion of the survey.
- Lead Agencies: USFWS, CWS, NPS
- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department; Oregon Department of Fish and Wildlife; Nevada Department of Wildlife; Confederated Salish and Kootenai Tribes; Alberta Sustainable Resource Development; British Columbia Ministry of Environment, Greater Yellowstone Trumpeter Swan Working Group
- Priority: 1
- Schedule: 2010

Task 3. Survey the RMP/U.S. Breeding Segment in mid-September to estimate the abundance of swans and to assess production. Report the results annually 60 days after completion of the survey.
- Lead Agencies: USFWS, Regions 6 (primary lead) and 1: National Park Service; Wyoming Game and Fish Department; Oregon Department of Fish and Wildlife
- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Confederated Salish and Kootenai Tribes; US Forest Service
- Priority: 1
- Schedule: Annually

Task 4. Assess progress toward achieving the year 2013 objective of 165 nesting pairs (718 adults and subadults) by inventorying the RMP/U.S. Breeding Segment nesting pairs and recording their distribution throughout their range in the conterminous United States. Results will be reported annually. Canada will conduct a similar survey at five year intervals (see Task 1.)
- Lead Agencies: USFWS
- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Wyoming Department of Game and Fish; Confederated Salish and Kootenai Tribes; Greater Yellowstone Trumpeter Swan Working Group
- Priority: 1
- Schedule: Annually

Task 5. Continue production surveys following protocol developed by the Greater Yellowstone Trumpeter Swan Working Group.

- Lead Agencies: USFWS
- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Wyoming Game and Fish Department; Confederated Salish and Kootenai Tribes
- Priority: 1
- Schedule: Annually

Task 6. Increase sample collection and develop a necropsy protocol and a centralized database for mortality data.

- Lead Agencies: USFWS
- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Utah Division of Wildlife Resources; Wyoming Game and Fish Department Confederated Salish and Kootenai Tribes
- Priority: 2
- Schedule: Ongoing

Task 7. Survey the RMP during winter to estimate abundance of swans and assess production. Report the results annually 60 days after completion of the survey.

- Lead Agencies: USFWS, Regions 6 (primary lead) and 1; National Park Service; Wyoming Game and Fish Department; Oregon Department of Fish and Wildlife
- Participating: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Utah Division of Wildlife Resources; Confederated Salish and Kootenai Tribes; US Forest Service
- Priority: 1
- Schedule: Annually

Task 8. Evaluate the feasibility and utility of developing pre-nesting swan monitoring plan in the RMP U.S range to assist in determining pre-nesting limiting factors.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Confederated Salish and Kootenai Tribes
- Participating: Greater Yellowstone Trumpeter Swan Working Group
- Priority: 3
- Schedule: 2010-2013

Strategy 2: Released swans should be marked with neck collars or colored leg bands as well as USGS legs bands to facilitate tracking of movements and documentation of mortalities.

Task 1. Maintain records of sightings and other encounters of marked swans, in the database maintained by USFWS (DMBM) in Portland, OR. Provide access to data by all

management agencies and organizations. As needed, prepare reports detailing locations, sexes, ages and numbers of individuals marked and a summary of encounters.

- Lead Agencies: USFWS
- Participating: The Trumpeter Swan Society; Wyoming Game and Fish Department; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Confederated Salish and Kootenai Tribe.
- Priority: 2
- Schedule: Ongoing

Strategy 3*:* Inventory the availability and suitability of seasonal habitats throughout the range of RMP trumpeter swans.

Task 1. Develop a format for trumpeter swan habitat atlas and standardized protocols for data acquisition and utilization.

- Lead Agencies: USFWS; CWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Wyoming Game and Fish Department; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Confederated Salish and Kootenai Tribes
- Participating: The Trumpeter Swan Society, USGS-BRD, Intermountain West Joint Venture
- Priority: 2
- Schedule: 2009-2013.

F. Maintain and manage sport hunting of tundra swans in the Pacific Flyway in a manner compatible with trumpeter swan conservation.

Strategy 1. The Pacific Flyway Council will work with the other Flyway Councils to ensure an integrated approach to trumpeter swan conservation and tundra swan harvest management throughout the annual Flyway meetings and the annual migratory bird hunting regulation process.

Task 1. Work cooperatively with the USFWS, Pacific Flyway states, and concerned nongovernmental organizations and individuals to retain federal regulations that will permit the continuation of sport hunting opportunities consistent with the long-term conservation of the RMP trumpeter and western tundra swan populations. Compatible tundra swan hunting includes a very limited take (managed by annual quota) of trumpeter swans. The preferred alternative in the USFWS's Environmental Assessment on a Proposal To Establish Operational General Swan Hunting Seasons in the Pacific Flyway is considered the best approach for addressing the potential conflicts between trumpeter swan management and tundra swan sport hunting (Appendix 6).

- Lead Agencies: Pacific Flyway Council, USFWS
- Participating: Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Utah Division of Wildlife Resources
- Priority: 1
- Schedule: Ongoing

Task 2. Continue to carefully monitor the swan harvest in Montana, Nevada, and Utah. The swan season will be closed if the take of trumpeter swans permitted by regulation is reached. Seriously consider implementation of hunter swan identification certification in Montana and Nevada as has been implemented in Utah.

- Lead Agencies: Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Utah Division of Wildlife Resources
- Participating: USFWS
- Priority: 1
- Schedule: 2008-2010.

Public Education

Public interest in RMP trumpeter swans and their management has traditionally been very high locally, regionally, and nationally. It continues to be high and will certainly remain high in the in the foreseeable future. This level of public interest requires that clear, accurate, and sometimes detailed information is shared among cooperating state and federal agencies, is shared with concerned nongovernmental organizations, and the general public.

Objective: Provide cooperating agencies, concerned nongovernmental organizations, and the general public with up-to-date, clear, and accurate information on management activities, problems, and accomplishments in a timely and professional manner.

Strategy: Develop an effective public information program, coordinate press releases, and generate interpretive materials and distribute them throughout the RMP range.

Task 1. Develop and distribute interpretive materials including a video and/or slide show on restoration efforts, posters regarding sightings of marked swans, public service announcements regarding "Don't Shoot Trumpeters," and a pamphlet providing a synopsis of the RMP management program.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Utah Division of Wildlife Resources; Wyoming Department of Game and Fish; Confederated Salish and Kootenai Tribes
- Participating: The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

Task 2. Develop an effective network to disseminate accurate information to the information and education branches of the involved agencies.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Utah Division of Wildlife Resources; Wyoming Department of Fish and Game; Confederated Salish and Kootenai Tribes
- Participating: The Trumpeter Swan Society

- Priority: 1
- Schedule: Ongoing

Task 3. Educate visitors to Yellowstone National Park and Grand Teton National Park on the conservation of trumpeter swans and the historic role of the parks in the early protection of swans.
- Lead Agencies: National Park Service
- Participating:
- Priority: 1
- Schedule: Ongoing

Task 4. As needed, develop and distribute information on supplemental feeding including the Pacific Flyway's position that such feeding is biologically unnecessary and is counter to the goal and objectives of this management plan.
- Lead Agencies: Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Utah Division of Wildlife Resources; Wyoming Department of Fish and Game; Confederated Salish and Kootenai Tribes
- Participating: USFWS, The Trumpeter Swan Society
- Priority: 2
- Schedule: Ongoing

Task 5. As needed, develop and distribute information on management activities, problems, and accomplishments in a timely manner.
- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Utah Division of Wildlife Resources; Wyoming Department of Fish and Game; Confederated Salish and Kootenai Tribes
- Participating: The Trumpeter Swan Society
- Priority: 1
- Schedule: Ongoing

STATUS

Winter Status

Surveys for Numbers and Distribution. – The RMP swans can best be counted in midwinter because Canadian and Tri-state flocks winter sympatrically in the Tri-state Region. The ability of cooperating agencies to monitor the entire RMP has become more difficult and costly. The population is dispersing to new sites scattered across their winter range including most western states and survey costs have increased. Although survey efforts have been conducted since the late 1930s, the FWS's Midwinter Trumpeter Swan Survey was initiated in 1972 (Figs. 4-6) (Appendix 1). Because Canadian flocks are difficult to survey on their widely dispersed breeding grounds, annual winter estimates are derived by subtracting the counts from the previous Fall Survey of the U.S. Breeding Segment from the total number of swans counted during the Midwinter Survey (Figs. 14, 16) (Appendix 1-2).

During the 1980s, a few trumpeters, including marked RMP swans, wintered in California, Colorado, New Mexico, Nevada, Oregon, and Utah (Gale et. al. 1987). Efforts to reduce the number of wintering swans at HSP and RRL NWR in the late 1980s and early 1990s resulted in 1,477 swans from the RMP being translocated to sites in Oregon, southern Idaho, Utah, and southwestern Wyoming. With the exception of Fish Springs NWR, these releases show some signs of swans using new wintering areas and migration routes that may divert swans away from the core Tri-state Area; the moderate increases have occurred on American Falls Reservoir, southeastern Idaho, which includes part of the Fort Hall Indian Reservation. In Wyoming translocations of wild and captive-raised swans resulted in the establishment of new wintering areas along the Salt River and Green River drainages. While the Salt River remains open in most winters, the winter habitat along the Green River is limited to the 25-30 mile stretch below Fontenelle Dam to Seedskadee NWR that generally remains ice-free. The number of wintering swans on the Salt River increased from 18 in 1990 to 193 in 2007 and in the Green River from 20 in 1998 to 146 in 2007 (Patla 1999-2007).

The majority of Canadian swans continue to migrate south along the East Front of the Rocky Mountains to the core Tri-state Area (Fig. 1, 2). A very small number may be migrating southwest across northern Idaho to California; a few others may be migrating southwest across southern Idaho (following the Snake River) to California. It is currently unclear just how important northern Nevada and Utah are in providing migration linkages to wintering sites outside the core Tri-state Area. Some believe the use of other migration routes would be more desirable since conflicts with tundra swan hunts in Utah and Nevada might be reduced.

In response to the range expansion efforts, the Midwinter Survey and the Fall Survey have been expanded to include Gray's Lake NWR and the Snake River from Idaho Falls to Bruneau Dunes State Park (Idaho); the Salt River, Green River and some sites in the Wind River drainage (Wyoming); Malheur NWR and Summer Lake Wildlife Area and vicinity (southeast Oregon); and Ruby Lake NWR and vicinity (Nevada).

Winter Mortality. – There is no consistent monitoring program to detect mortality across the Tri-state Area. Wyoming documented 176 swan mortalities from 1991 through April, 2006. Most mortalities have occurred during winter and early spring. Of the mortalities that could be aged (n=165), 59% were adults, 11% were yearlings, and 30% were cygnets. Cause of death could not be determined on 72% of the birds. When cause of death could be determined, most swans died from collisions or predation. Body condition was generally poor, suggesting difficulty in finding food. Observations of 99 trumpeter swan mortalities during the winters of 2000-2001 through 2002-2003 in southwestern Montana, eastern Idaho, and northwestern Wyoming were summarized by C. Whitman (unpublished report). Of the 99 swans 36 died of undetermined causes. Of the remaining 63, 43% (n=27) died as the results of collisions. Nineteen were adults and eight were cygnets. The next most significant mortality factor was lead poisoning to which the deaths of nine (14%) were attributed. One of these birds probably died after ingesting a piece of solder wire that was probably from a fishing streamer. Three of the dead swans had lead shot pellets in their gizzards. Another 11% (n=7) of swan mortalities was attributed to predation by coyotes. All of them were cygnets. Other causes of swan deaths reported included emaciation, bumble foot, aspergillosis, gunshot wounds, sarconema, fish hook ingestion, cancer, aflotoxicosis, neck collar injury, and unknown disease.

Documented losses of RMP have not been common. One exception was a significant mortality event that occurred during the winter of1991-1992 at Fish Springs NWR, Utah. Of 36 swans wintering on the refuge, 28 died. Necropsies by the National Wildlife Health Center, FWS (now a part of U.S. Geologic Survey), identified a systemic protozoan infection by an organism similar to *Histomonas* sp.to be the apparent cause. In February 1992, the eight remaining swans were euthanized to prevent their dispersal from Fish Springs. At least five of these also were infected and showed evidence that they were recovering. Because of this event additional translocations of trumpeter swans to Fish Springs NWR have not been attempted.

Summer Status

Surveys for Numbers and Distribution. – The RMP/U.S. Breeding Segment is monitored by a coordinated FWS Fall Survey in the Tri-state Region, along with surveys at Malheur NWR, Ruby Lake NWR and vicinity, and Summer Lake WMA and vicinity (Appendix 2). In addition, Bear Lake NWR, Grays Lake NWR, Malheur NWR, Ruby Lake NWR, and Red Rock Lakes NWR, and the states of Idaho and Wyoming each year conduct one or more spring/summer surveys and additional ground surveys to document nesting effort and hatching success; the state of Oregon conducts an annual waterfowl breeding population survey that includes swans.

RMP/Canadian flocks in Grand Prairie were surveyed annually in June and September by the Canadian Wildlife Service (CWS) from 1959 to 1994. After 1994 and until 2001 the surveys were conducted only in September to determine production estimates for the flock and to identify potential cygnets for relocation to Elk Island National Park up to 2001 (Appendix 4). Regular surveys have been conducted in Elk Island National Park to monitor the reintroduction efforts through 2007. Surveys have been conducted by Alberta Sustainable Resource Development, Fish and Wildlife Division, in selected locations most years during September; these surveys included the Peace River region, the Edson/Whitecourt region, the High Prairie region, the Lac La Biche region, and the Cardston/Pincher Creek/Waterton National Part region (up to and including 2005). These sites as well as others, including Nahanni National Park, are currently surveyed as part of the quinqennial survey (Beyersbergen 2007).

The range-wide North American Trumpeter Swan Survey was initiated in 1968, was completed again in 1975, and has been completed at 5-year intervals since by the USFWS, CWS, cooperating states and provinces, and other partners (Fig. 3). This survey is the official range-wide status assessment for trumpeter swans. In most areas this survey is completed in late summer or fall. Securing funding for the survey in 2005 was difficult and we are concerned about having sufficient funding for future surveys. Recurring surveys that are not completed annually are a difficult challenge for annual budget cycles.

Production. – During the past 20 years, cygnet production among the Tri-state Area Flocks has fluctuated markedly (Fig. 7) (Appendix 5). Production appears to be lower during cool, wet springs or following harsh winters and higher in warm, dry springs or following mild winters. Since monitoring began in the 1940s, the migratory RMP/Canadian Flocks have been more productive per nest attempt than the Tri-state Area Flocks (Gale et al. 1987). The Midwinter Survey provides the best annual opportunity to assess total RMP productivity (Figs. 4-6). Annual cygnet recruitment in the RMP/Canadian Flocks now exceeds the total size of all Tri-state Area Flocks combined. Because most of these birds winter with the Tri-state Area Flocks there is concern that continued growth of the

RMP/Canadian Flocks may have an adverse impact on the relatively sedentary Tri-state birds. The RMP/Canadian Flocks depart during March for lower elevation wetlands to the north while the resident swans must often wait until May for substantial wetland habitat to become available. If RMP population growth continues, demands on winter and early spring habitat will likely increase without significant redistribution of swans. In 2006 the number of breeding pairs in the RMP/US Breeding Segment exceeded the 1998 plan revision objective by about 15%, but was 40% below the 2001 TSIP objective and 49% below the 2013 objectives established in this plan revision.

Breeding Distribution. – In the U.S., potential breeding habitat has been identified in western Montana and Wyoming, southeastern, western and northern Idaho, eastern Washington, eastern Nevada, and south central and southeastern Oregon. In recognition of the need to broaden the distribution of swans nesting in the Tri-state Region and other U.S. locations, cooperative efforts are underway to establish nesting flocks in more areas. An important long-term goal in these efforts is to establish connectivity between existing flocks to increase genetic exchange among flocks. Swans are now nesting at Bear Lake NWR, Grays Lake NWR, and the Fort Hall Indian Reservation (American Falls Reservoir), Idaho; the Flathead Indian Reservation in western Montana; the upper Green River south to and including Seedskadee NWR, Wyoming; wetland areas of south central Oregon; and on the Franklin Lake Wildlife Management Area and Ruby Lake NWR, Nevada.

In Canada during the last decade, distribution has expanded northwards and into areas of east-central Alberta, northeastern British Columbia, southeastern Yukon Territory, and southwestern Northwest Territories; swans in southwestern Saskatchewan were extirpated as of 1995. Restoration efforts at Elk Island National Park, Alberta, resulted in some yearlings following the tundra swan migration through the Flathead Valley, Montana, and into southern Oregon and northern California. It appears, however, that this linkage no longer exists. Opportunities to develop other breeding flocks that would winter outside the core Tri-state Area may exist in British Columbia, Alberta, and possibly northwestern Saskatchewan. Currently, swans in eastern Saskatchewan and western Manitoba are considered part of the Interior Population. In British Columbia and the Yukon Territory the breeding distributions of the RMP and PCP trumpeter swans are converging. The range-wide genetics survey (Oyler-McCance et al. 2006) suggests some genetic exchange has taken place in the area of convergence.

Some pioneering into vacant breeding habitat may have occurred as swans dispersed from winter release sites. Release of swans into summer habitats which link to wintering areas outside of the core Tri-state Area provide an additional way to disperse RMP swans as successfully demonstrated by the Wyoming Green River and the Idaho Bear Lake expansion projects.

As the RMP/Canadian flocks continue to grow, the numerical importance of the core Tri-state flocks to the entire population will continue to decrease. Additionally, the need for RRL NWR to provide swans for restoration efforts has declined as swans have become available from Canadian and Alaskan flocks. This plan recognizes, however, that current social, historical, and esthetic values of breeding swans in the Tri-state Region, particularly at RRL NWR, Yellowstone and Grand Teton National Parks, and in Idaho and Wyoming, likely equal or surpass their biological importance and will continue to do so in the future. This is because the general public, state agencies and nongovernmental organizations have a very high interest in their local breeding flocks and are determined to preserve them. Management strategies will attempt to maintain nesting trumpeters at RRL NWR and elsewhere in the Tri-state Region where they can exist on natural food sources.

MANAGEMENT ISSUES

Winter Distribution and Habitat. – Although the winter distribution of the RMP has expanded somewhat since 1998, managers believe it too restrictive to provide for continued population growth. Studies to date have not been able to identify factors that are limiting the birds' ability to expand their distribution. Restricted winter distribution may contribute to high winter cygnet mortality and could depress productivity in adults, particularly for resident swans that remain on these sites until immediately prior to nesting (Gale et al. 1987). High concentrations of swans and other waterfowl in the Henry's Fork area continue to have the potential to damage both aquatic vegetation and, thus, fish habitat by their heavy use of submerged macrophytes during the winter. RMP swans are doing well overall, increasing at an annual rate of 6% from 1972 to 2006 (USFWS 2007b). However, the trend for the RMP/US Flocks was only a 1.5% average annual increase from 1993-2005.

Managers have increased the amount of wintering areas somewhat, but do not know if those actions have influenced the overall population increase. The RMP/Canadian Flocks may use pre-nesting habitats (Beyersbergen 2007) prior to nesting that are not available to the RMP/US Flocks. During the 2005 surveys large areas of habitat that appeared suitable for trumpeter swan breeding were unoccupied. Vulnerability of the RMP to winter mortality due to starvation and disease remains a concern when they are concentrated in relatively small areas at the current principal wintering area in eastern Idaho (Henry's Fork and some of its tributaries, HSP, and Teton Basin in Teton County), in the Snake River drainage in Wyoming, and Malheur NWR in Oregon. Without a concomitant increase in winter habitats to allow greater dispersion of the wintering swans, these habitats will likely limit overall growth of the population. An assessment of the availability of additional suitable wintering areas continues to be a priority need.

RMP/US Breeding Segment Breeding Distribution. – The current breeding distribution of RMP/US Breeding Segment remains restricted. Because most swans do not migrate out of the core Tri-state Area, they contribute to the problems at principal wintering areas in eastern Idaho and provide one of the main justifications for desiring to develop a migratory population. A significant increase in the tendency of swans to migrate has not been observed. Expanding nesting and migration areas in a stepwise fashion to maintain or improve connectivity among breeding flocks would facilitate genetic diversity within the RMP and hopefully result in nesting aggregations that are more likely to winter outside of the Core Tri-state Area.

Assessment of suitable breeding habitat within the range of the RMP/US Breeding Segment and development of new partnerships is needed. Assessment work could be initiated in Idaho, Montana, Wyoming, Oregon, Nevada, Utah, Washington, and Colorado. As additional breeding areas are developed some additional pioneering by swans is expected.

Yellowstone National Park. – Yellowstone National Park supports resident, relative sedentary trumpeter swans year around, as well as regional migrants from the greater Yellowstone area and longer-distance migrants from Canada and elsewhere during winter. The National Park Service is committed to the conservation of resident trumpeter swans and preserving habitat for winter migrants in Yellowstone because swans are part of the natural biota and a symbolic species with considerable historical

significance. Trumpeter swans were nearly extinct in the U.S. by 1900, but a small group of birds survived by remaining year-round in the vast wilderness of the greater Yellowstone area. This remnant population enabled the restoration of the species. Since 1977 the park has supported relatively low and decreasing numbers of nesting pairs (median = 7, range = 2-17) and fledglings (median= 3, range = 0-12), while the abundance of the Rocky Mountain population has increased from <1,000 to >5,000 swans (McEneaney 2006, U.S. Fish and Wildlife Service 2005). Thus, it does not appear that the improved status of the RMP in general has benefited Yellowstone NP. The Park provides limited and temporary winter habitat for migrant swans due to limited sections of ice-free water that diminish as winter progresses (McEneaney 2006).

Counts of resident, adult trumpeter swans in Yellowstone decreased from a high of 69 in 1961 to 10 in 2007. Causes of this relatively consistent decrease are unknown, but may include decreased immigration, competition with migrants, and effects of sustained drought and predation on productivity (McEneaney 2006). The RMP trumpeter swan population operates at a scale larger than Yellowstone, and the dynamics of resident swans in Yellowstone appear to be influenced by larger flocks and management actions in the greater Yellowstone area and elsewhere. Numbers of adult swans counted during autumn aerial surveys at Yellowstone and Red Rock Lakes in the Centennial Valley of Montana indicated concurrent and substantial increases in abundance during 1931-1955, followed by concurrent and substantial decreases in abundance during 1961-2005 (R^2= 0.42, $F_{1, 59}$ = 42.7, P < 0.0001). These results suggest swan dispersal from birds nesting in the Centennial Valley may be an important factor for maintaining swans in Yellowstone by filling vacant territories or pairing with single adult birds (McEneaney 2006). Also, increases in the number of Canadian migrants to Yellowstone during winter over the last several decades may be reducing food resources for resident swans during breeding (U.S. Fish and Wildlife Service 1998). Resident swans in Yellowstone are also susceptible to random, naturally occurring events operating at local and regional scales (e.g., severe winter weather, droughts, and predation). Drought conditions since 1995 have been the most severe recorded in northwestern Wyoming (Division 01 Palmer Drought Severity Index) since monitoring began in 1895 (http://www.cpc.ncep/noaa.gov), resulting in an extensive reduction in the abundance and size of wetlands for nesting, molting, and feeding.

The general principles for managing biological resources in national parks direct managers to rely upon natural processes to maintain native species and influence natural fluctuations in populations of those species (National Park Service 2006). Thus, managers may intervene to manage individuals or populations of native species only when such intervention will not cause unacceptable effects to the populations or other components and processes of the ecosystems that support them. Managers at Yellowstone National Park identified the trumpeter swan as a native Species of Special Concern, listed them as a priority in the park's Strategic Plan, and established a Government Performance and Results Act goal to improve or stabilize the status of trumpeter swans from the 20 resident adults, seven nesting pairs, and two cygnets fledged in 2000 (National Park Service 2000).

Grand Teton National Park. – Grand Teton National Park (GTNP) supports resident, relative sedentary trumpeter swans year around, as well as regional migrants from the Greater Yellowstone area and longer-distant migrants from Canada and elsewhere during winter. The National Park Service is committed to the conservation of resident trumpeter swans in GTNP because swans are part of the natural biota and a symbolic species with considerable historical significance. Establishment of nesting pairs in GTNP contributed to the recovery of this species in western Wyoming and the Greater

Yellowstone area since the 1930's. In recent years, GTNP has continued to provide habitat for nesting and wintering swans. From 1996-2007, nesting pairs in GTNP comprised 30-40% of the total number of occupied nest sites in the core Snake River area (Patla 1999-2007) or 23% of all occupied sites in western Wyoming outside of YNP (n=4-7 occupied nesting territories per year). Over the same period, pairs in GTNP have fledged an average of 3.2 cygnets per years, accounting for 14% of production in western Wyoming. Production is highly variable, ranging from 0 to 9 cygnets fledged. Numbers of subadult swans that utilize Jackson Lake and reaches of the Snake River in the summer have been increasing in recent years indicating a potential need for additional nest sites in the future. Between 40 and 80 swans winter in GTNP along the main Snake River channel as well.

Although 11 different nest sites have been used over the last twelve years, and a few new sites have been established, swan pairs are no longer using some traditional sites that had been occupied for decades. Water levels have decreased substantially at some sites due to drought or undetermined causes. In addition increased human activities and predation may be affecting occupancy and productivity at some sites. Site specific assessments need to be completed for historic sites that are now unoccupied and sites with low productivity to identify limiting factors. Once those factors are determined, management actions should be implemented where possible to improve occupancy and production (Pacific Flyway Council 2002).

Because of the historic significance of trumpeter swans in the Greater Yellowstone area, the number of swans using GTNP, and the great interest by park visitors in swans, GTNP considers the trumpeter swan a Species of Special Concern. The park listed them as a priority species in their resource management plan (National Park Service 1995), and has established a Government Performance and Results Act (GPRA) goal to maintain, if not improve, trumpeter swan productivity in GTNP. Other GTNP goals for swan management include protection of know nest sites from human disturbance, educating the public about swans, and monitoring nest occupancy and productivity.

Spring Pre-breeding Habitat and Summer Habitat for Non-breeders. – These needs have not been included in previous plans. The requirements for and availability of these habitats is poorly understood. If there are deficiencies, they may adversely impact productivity and recruitment. Due to their migratory movements, the RMP/Canadian Flocks apparently have better access to these habitats after they leave wintering grounds which may be an important factor in their being more productive than the RMP/US Flocks.

Canadian Breeding Range Issues. – Conservation issues associated with the Canadian breeding range of RMP trumpeter swans (Alberta, British Columbia, Northwest Territories and the Yukon) revolve around land use, land development and land management. Specific issues are related to the energy sector (oil and gas industry), other resource extraction activities (forestry and mining), First Nations and the Treaty Settlement process and transportation. The effects of some developments can be cross-cutting and cumulative. For example, roads constructed for and oil and gas project facilitate timber cutting operations in the same area. Resource extraction activities can result in wetland loss or wetland degradation while land management and land development activities will influence the degree of protection and future land use activities on and around wetlands used by nesting swans in Canada.

Energy Exploration and Petroleum Industry. – The petroleum industry includes conventional oil and gas fields, heavy oil, oil sands deposits and numerous oil and gas processing plants. There are major

exploration, development projects and pipelines across the RMP trumpeter swan breeding range in Alberta and British Columbia. There is renewed interest in Mackenzie Valley/Beaufort Sea oil and gas and oil and gas exploration is underway again in the Mackenzie Delta and the offshore. A proposed route for a pipeline from western arctic oil fields follows the length of the Mackenzie Valley.

Other resource extraction (forestry and mining) and associated transportation needs. – Current management of the boreal forest is largely in the hands of the provincial and territorial governments. Each province has its own legislation, regulations, and policies for allocating harvesting rights and forest management responsibilities such as monitoring harvesting and encouraging sound logging and reforestation practices. Activities associated with forestry and mining can result in wetland losses, wetland degradation or overall changes in the hydrology of the boreal forest and in extensive road expansion. Regional differences in regulations or policies also lead to different processes and guidelines on development and wetland management and protection.

Commercial forestry activity is limited in the southwestern portion of the Northwest Territories and in the southernmost part of the Yukon Territory. It is much more extensive in northern Alberta and British Columbia. The cumulative and long-term effects of human activities on the boreal forest remain uncertain.

Mining for coal occurs along the eastern and western ranges of the Rocky Mountains in Alberta and British Columbia. In the Northwest Territories, the North Slave Region is a center of northern mining activity although mining activity is growing in southwestern Northwest Territories. Copper, gold and other mining occurs in the Southern Yukon Territory. Small mining projects at early stages of exploration are also scattered across the provinces and territories.

First Nations and Political Development in Northern Canada and British Columbia. – All of northern Canada and most of British Columbia is subject to completed or pending land claims. Through the claims process, Aboriginal groups receive financial compensation, a variety of socio-economic benefits, a fixed allocation of private, collectively-owned lands, certain wildlife harvesting rights, and a meaningful role in the environmental management of their settlement areas in exchange for the surrender of their claim. Aboriginal views on, and approaches to, land management, monitoring and population management need to be integrated into the planning and delivery of conservation programs over some of the RMP trumpeter swan breeding areas in Canada.

Inter-specific Competition. – Trumpeter swan interactions with tundra swans, competition with tundra swans and other waterfowl for resources, and vulnerability to diseases and parasites at potentially new release sites and on new migration routes remain poorly understood. This lack of knowledge complicates range expansion planning and implementation.

Population Monitoring. – The ability to monitor the entire RMP and assess progress toward achieving the goal and objectives of this plan is becoming more difficult as (1) the population is dispersing to new sites in both breeding in wintering and is scattered across a broader geographic area in Canada and most western states, and (2) funding for surveys has been reduced in Canada and the U.S. and survey costs continue to increase in both countries, so that maintenance of surveys in breeding and wintering areas is increasingly more difficult.

Monitoring Impacts of Swans and other waterfowl on Fish Habitat. – Vegetation monitoring has been de-emphasized on the Henry's Fork. This should be revisited to determine if additional data are needed. A current assessment is needed to determine if there have been recent changes in aquatic vegetation that might warrant resumption of plant community monitoring.

Habitat Loss and Disturbance. – Rapid increases in human populations and development in greater Yellowstone area and elsewhere in the RMP swan range are a growing concern. Habitat destruction and fragmentation are threatening swan habitats. Protection of core nesting, migration, and winter habitats is becoming more and more important. All conservation partners need to work together to identify and prioritize swan habitat for protection and enhancement throughout the annual range.

Power Line Collisions, Lead Poisoning, other Contaminants, Illegal Shooting and Disease. – A consistent approach to risk assessment and mitigation of swan collisions with power lines, wind turbines, communications towers, and other structures should be developed and be included in any swan management project.

Losses of swans to lead poisoning continue. Increased emphasis on investigation of losses and sources is desirable. Assessment of potential hazards due to lead poisoning or other contaminants, such as mercury, should be included in any habitat assessment or habitat project.

Although significant losses of swans to avian diseases such as botulism and cholera have not been reported in RMP range, they remain a concern. West Nile Virus has resulted in the mortality of a number of migratory bird species in recent years, but the impact on trumpeter swans is unknown. In other parts of the world avian influenza has killed individuals of some swan species, suggesting they are susceptible to the H5NI strain.

Although documentation is limited, illegal shooting by rifle appears to be more common than by shotgun.

Reporting and compilation of swan mortality from all sources should be improved.

Genetic Diversity. – Trumpeter swans appear to have much lower mitochondrial DNA variability than other waterfowl studied thus far (Oyler-McCance et al. 2006, 2007). Genetic diversity and relationships should be a planning consideration for all restoration projects and a consideration for captive breeding stocks.

Sport Hunting of Tundra Swans. – Although the potential for conflicts between trumpeter swan restoration and range expansion efforts and existing tundra swan hunting remains, the results of the range-wide genetics survey have alleviated the concern to some degree. The approach described by the preferred alternative in the 2003 Environmental Assessment has proved effective in minimizing the take of trumpeters during swan seasons. This approach is designed to avoid conflicts with trumpeter swans in time and space. Utah developed an innovative identification test that potential tundra swan hunters are required to pass before they will be issued a swan permit. Nevada requires all successful swan hunters to have the identification of their harvested swan determined by a representative of the Nevada Department of Wildlife. If the numbers and range of RMP trumpeters continues to expand the potential for additional conflicts will increase and will need to be addressed by wildlife managers. The annual

unintentional take of trumpeter swans has been well below the limited quotas in Utah and Nevada (Appendix 6)

RECOMMENDED MANAGEMENT STRATEGIES

Objective: The Pacific Flyway Council encourages member States, Provinces, and Territories, USFWS, CWS, and all other partners concerned or interested in RMP trumpeter swan conservation to actively pursue funding to address priority research and information needs.

Strategy: Develop and maintain a prioritized list of research and information needs.

Task 1. The RMP Trumpeter Swan Subcommittee will review, update and prioritize the list annually.

- Lead Agencies: RMP Trumpeter Swan Subcommittee
- Participating: All interested partners
- Priority: 1
- Schedule: Annually

Task 2. Agencies and partners will use the list to inform their budget processes and to inform the development of grant proposals.

- Lead Agencies: USFWS; Idaho Department of Fish and Game; Montana Department of Fish, Wildlife and Parks; Nevada Department of Wildlife; Oregon Department of Fish and Wildlife; Utah Division of Wildlife Resources; Wyoming Department of Fish and Game; Confederated Salish and Kootenai Tribes
- Participating: All interested partners
- Priority: 1
- Schedule: Ongoing

Prioritized List: (H=High, M=Moderate, L=Low)

1. Obtain and analyze genetic sample from RMP/restoration Flocks and other groups of swans that were not included in the recent genetics study. (H)

2. Study the feasibility of using stable isotope analysis of trumpeter swan feathers to determine affiliations to breeding areas. (H)

3. Review the design of the quinquinnial survey to evaluate the potential for a more cost efficient survey as breeding ranges continue to expand and costs increase. (H)

4. Develop and validate a habitat model to identify suitable trumpeter swan nesting habitat and develop a comprehensive database of potential nesting habitat throughout the RMP range. (H)

5. Develop and validate a winter habitat model similar to the one for nesting habitat and develop a comprehensive database of potential wintering sites. (H)

6. Initiate study to assess and model both the hydrologic component and vegetation successional cycles of montane wetlands in the Northern Rocky Mountains for management of trumpeter swan breeding habitat. (H)

7. Develop Best Management Practices for Boreal Forest wetland and land management for conservation of trumpeter swans and other wetland dependent species. (H)

8. Ascertain the seasonal movements of Canadian and Tri-state trumpeter swans using satellite tracking of transmitters. (M)

9. Develop methods to routinely monitor vegetation trends at key wintering sites. (M)

10. Assess trumpeter swan interactions with tundra swans and competition with tundra swans and other waterfowl for resources. (M)

11. Develop needs assessment and objectives for an operational banding program to capture, legband and mark a representative sample of RMP trumpeter swans. Develop, maintain and enhance a comprehensive database of encounters that can be used to help assess management programs. (M)

12. Initiate a study to determine factors affecting aquatic vegetation development following ice-off and energy budgets/behavioral strategies of resident Tri-state swans in the pre-nesting period to assess limiting factors during this segment of the nesting season. (M)

13. Initiate a radio-tracking study of subadult swans in the core Tri-state area and selected expansion areas to determine recruitment, mortality and dispersal rates. (M)

AGENCY RESPONSIBILITIES AND FUNDING

The bulk of the funding for RMP conservation and range expansion has been provided by the FWS. However, significant funding, both in cash payments and in-kind match, have been provided by the Wyoming Wetland Society, U.S. Bureau of Reclamation, the Henry's Fork Watershed Council, the Henry's Fork Foundation, The Trumpeter Swan Society, the Confederated Salish and Kootenai Tribes, the Blackfoot Challenge, and the states of Wyoming, Oregon and Idaho, with in-kind contributions provided by the states of California, Montana, Nevada, Utah, and Wyoming primarily for monitoring color-marked swans and assessing habitat.

The Pacific Flyway Council strongly recommends that all agencies concerned with the RMP provide personnel and equipment to help implement management projects. This support is needed for, but not limited to, the capture and transport of swans to release sites, surveys, and monitoring of the population.

The following are the major ongoing tasks (in order of priority) and recommended agency involvement:

1. Monitoring - Monitoring of the entire RMP during winter months is a high priority. Population size and winter distribution data are essential in order for the subcommittee to assess progress toward reaching this plans goal and objectives.

2. Surveys - Several surveys have evolved for monitoring population trends and distribution of RMP trumpeter swans. The USFWS is responsible for coordinating efforts and reporting survey data. The following are ongoing surveys and participants:

    a. Breeding Flock Surveys - USFWS coordinates nesting data gathered by states, federal agencies and other cooperators.

    b. Fall Survey of the RMP/U.S. Breeding Segment to estimate the total number of swans and production. This survey is coordinated by the USFWS with assistance from states with breeding flocks and other partners.

    c. Midwinter Survey of the RMP to estimate total number of swans and production. This survey is coordinated by the USFWS with assistance from the states and other partners.

    d. Quinquennial North American Trumpeter Swan Survey to estimate the continental abundance of trumpeter swans. This survey is coordinated by the USFWS with assistance from the states, CWS, Canadian provinces and territories, The Trumpeter Swan Society, and other partners.

3. Captive breeding and releases – Recent efforts to hatch trumpeter swan eggs in captivity and to release birds produced as cygnets or yearlings has been successful in establishing trumpeter swans in several new areas. The USFWS and the Wyoming Wetland Society have led this effort with birds being produced at the WWS facility near, Jackson, Wyoming. The areas below are currently receiving birds from this effort or are approved as release sites. They are listed in priority order. Additional locations must be assessed, endorsed by the RMP Trumpeter Swan Subcommittee and the Study Committee, and approved by the Council before swans may be released there (Appendix 11).

    a. Lower Green River, Wyoming
    b. Bear Lake, Idaho
    c. Blackfoot River Valley, Montana
    d. Flathead Indian Reservation, Montana
    e. Fort Hall Indian Reservation, Idaho
    f. Summer Lake Wildlife Management Area, Oregon

ANNUAL REVIEW

Reporting Progress and Review of This Plan

Task 1. Annually by 15 June, summarize data collected during the preceding 12 months and prepare a brief synopsis. This synopsis will be used by the Subcommittee later in July to develop work plans for the following fall and winter. The synopsis will include management actions taken during the preceding 12 months, response of swans to management actions taken, movements and distributions of marked swans, results of recent surveys (e.g., Fall Survey of the RMP/U.S. Breeding Segment, Midwinter Survey of RMP Trumpeter Swans, breeding and nesting pair surveys, nest success), problems encountered, and other relevant information. This will be compiled by the Chair of the RMP Trumpeter Swan Subcommittee with input from all appropriate sources.

Task 2. The Subcommittee will meet annually or more often if needed, to review progress toward the goal and objectives of this plan and to recommend revisions to the Pacific Flyway Study Committee. The Pacific Flyway Study Committee will submit all proposed, significant revisions to this management plan to the Pacific Flyway Council for approval. The next formal revision is planned to be completed in 2013.

Task 3. As appropriate, the Subcommittee will report on accomplishments and shortcomings of its cooperative management effort to the Pacific Flyway Council, those state and federal agencies having management responsibilities, and those agencies and organizations either interested or cooperating in the management of trumpeter swans of the Rocky Mountain Population.

Subcommittee Composition and Rotation of Chair

The Subcommittee will be comprised of representatives from the states of California, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming, and USFWS's Regional Migratory Bird Chiefs from Region 6 (Denver) and Region 1 (Portland), The Trumpeter Swan Society, and such other members as the Subcommittee deems appropriate to appoint. Each representative will serve as chairman of the Subcommittee for a 2-year period (1 October through 30 September). The chairmanship will rotate as follows:

Utah	2011-2013
Nevada	2013-2015
Wyoming	2015-2017
Montana	2017-2019
USFWS R6	2019-2021
Idaho	2021-2023

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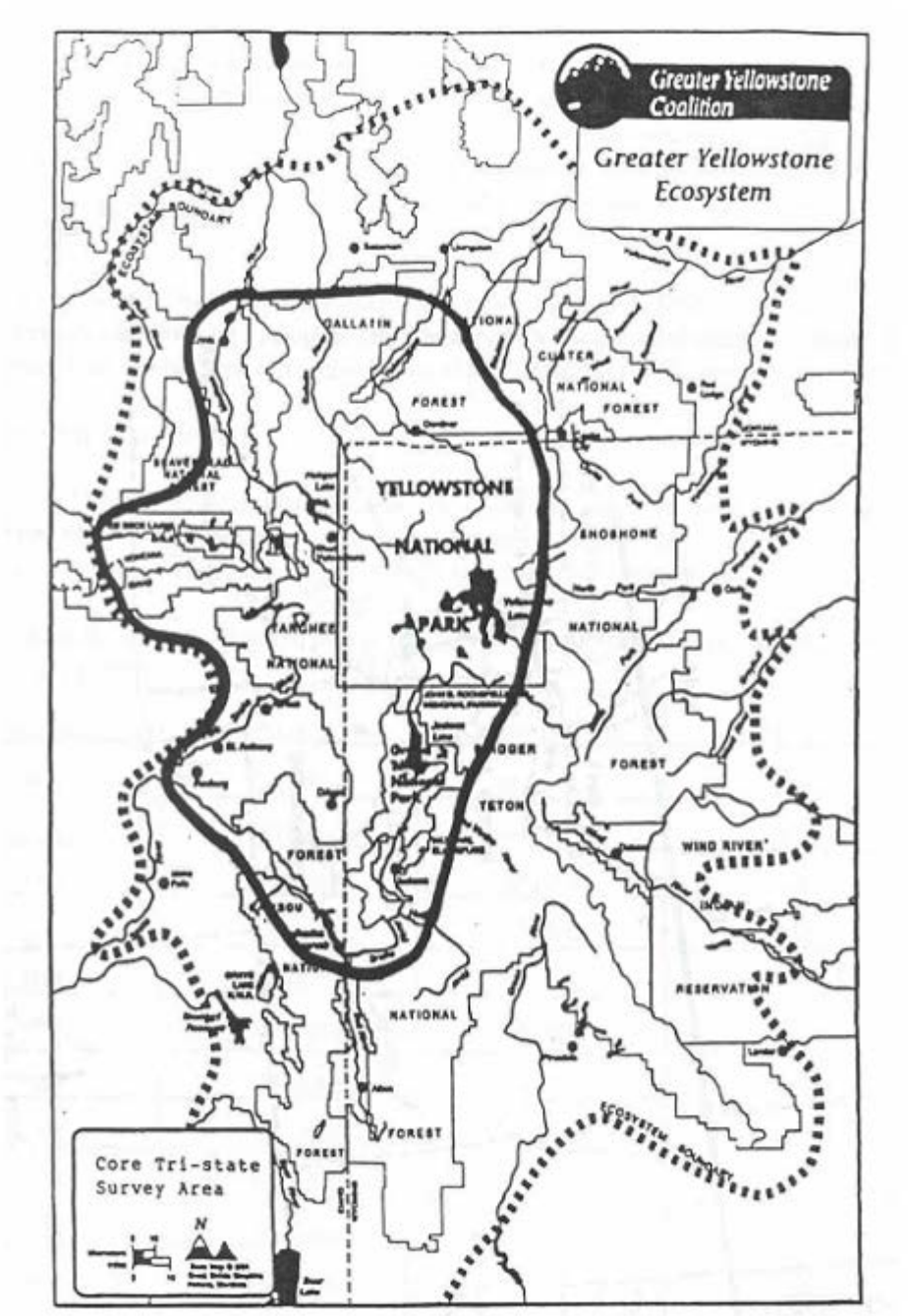


Figure 1. Map showing the core Tri-state Area of southeast Idaho, southwest Montana, and northwest Wyoming for the Rocky Mountain Population of trumpeter swans.

Provided by the Greater Yellowstone Coalition, Bozeman, Montana.

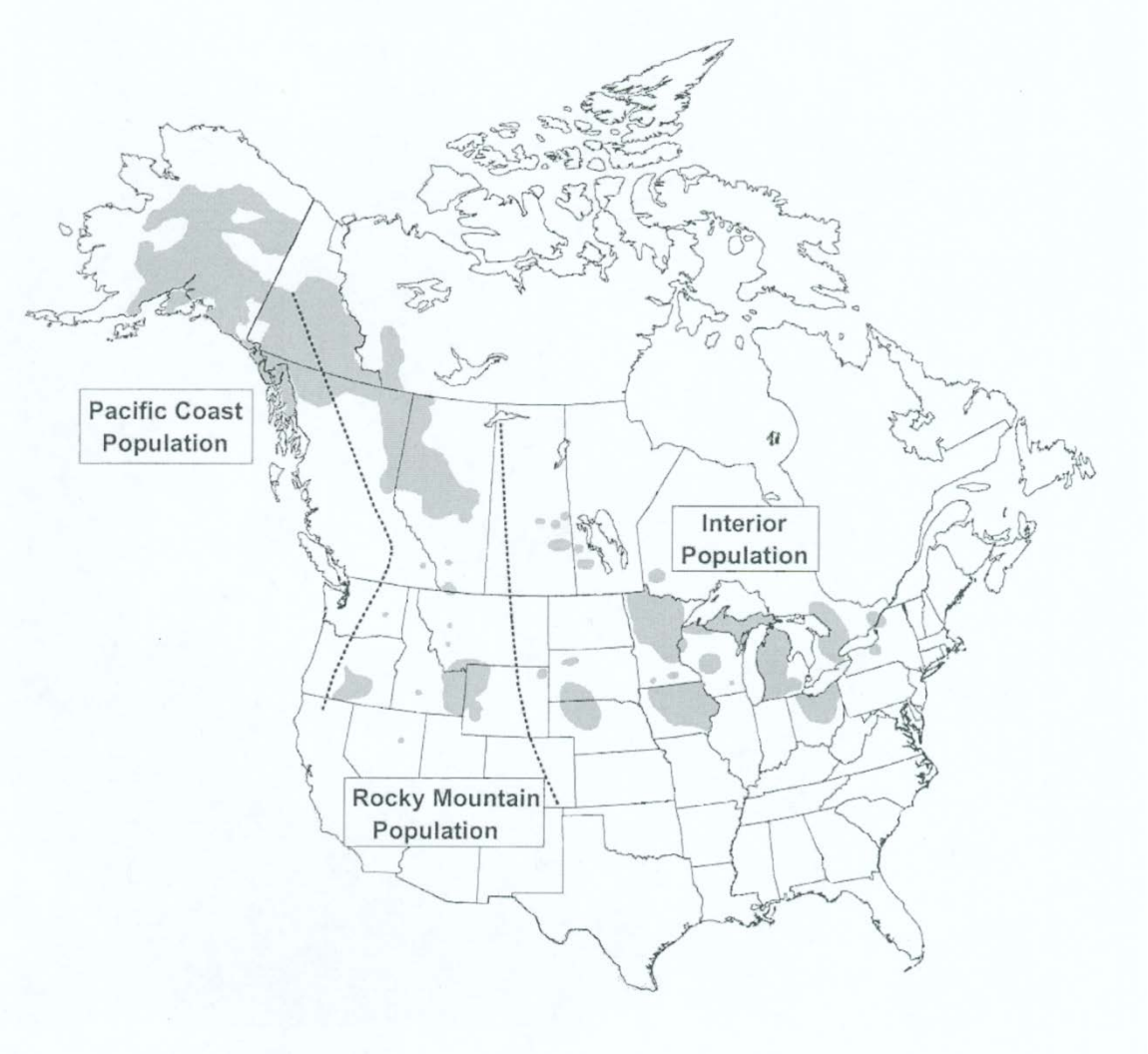


Figure 2. Approximate ranges of Pacific Coast, Rocky Mountain, and Interior populations of trumpeter swans during late summer, 2005.

Provided by T. Moser, USFWS, DMBM, 2006.

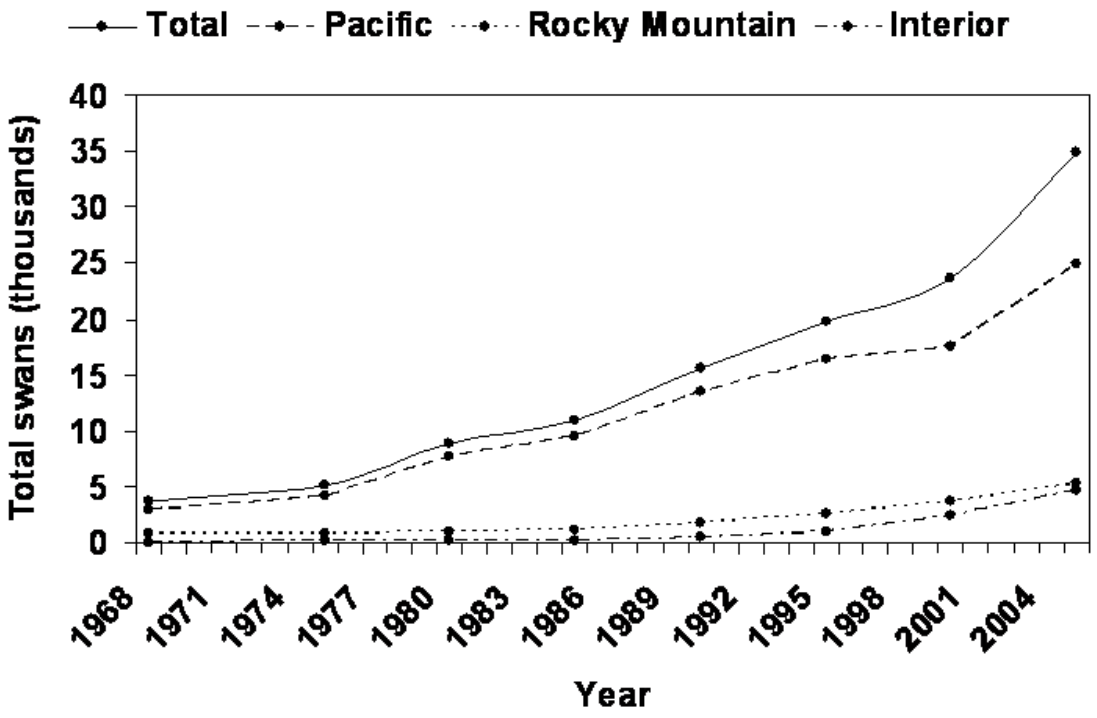


Figure 3. Trumpeter swan population estimates obtained from the rangewide North American Trumpeter Swan Survey conducted during midwinter, by management unit, 1968-2005.

Provided by T. Moser, USFWS, DBMO, 2006.

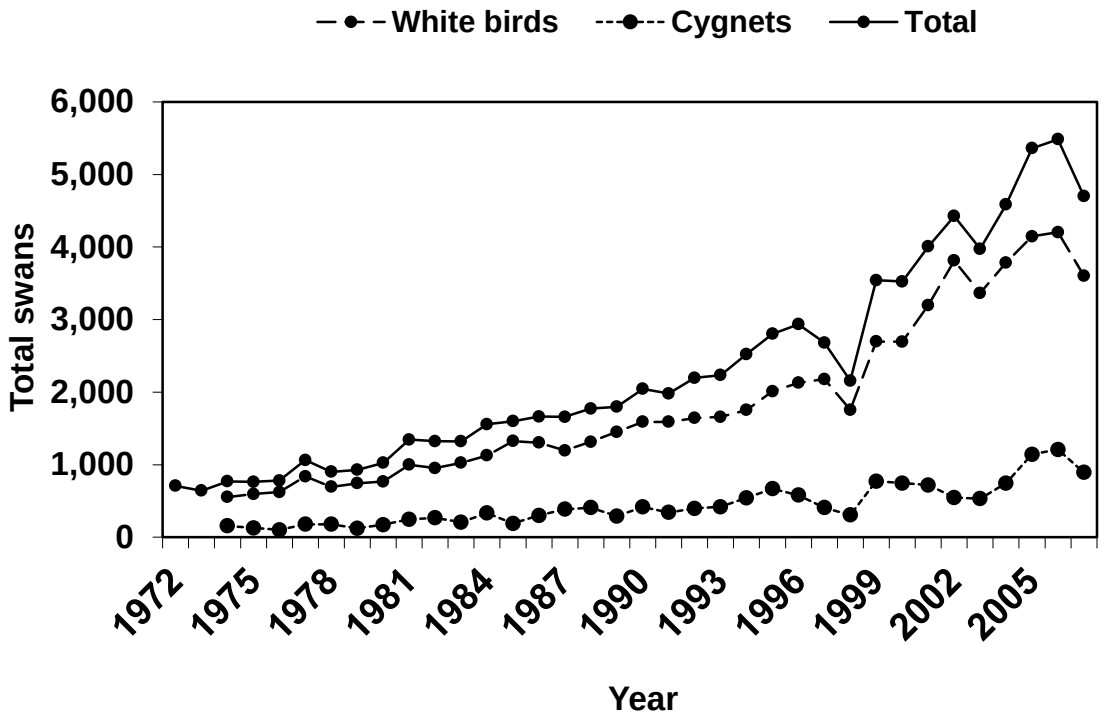


Figure 4. Results of Midwinter Surveys of the Rocky Mountain Population of trumpeter swans in Idaho, Montana, Nevada, Oregon, Utah, and Wyoming, 1967-2007.

From 2007 Winter Survey, Rocky Mountain Population of Trumpeter Swans, May 2007, USFWS, MBSP, Lakewood, Colorado. Yellowstone National Park was not surveyed in 1998 due to weather.

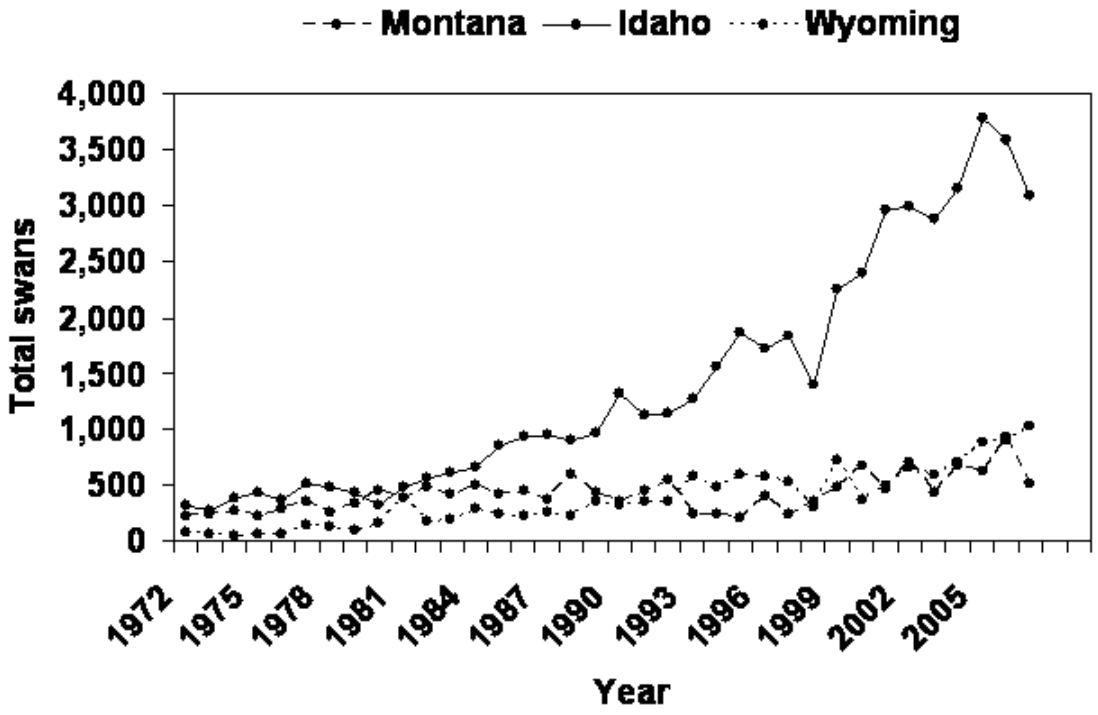


Figure 5. Results of Midwinter Surveys of the Rocky Mountain Population of Trumpeter Swans in Idaho, Montana, and Wyoming, 1972-2007.

From 2007 Winter Survey, Rocky Mountain Population of Trumpeter Swans, May 2007, USFWS, MBSP, Lakewood, Colorado. Yellowstone National Park was not surveyed in 1998 due to weather.

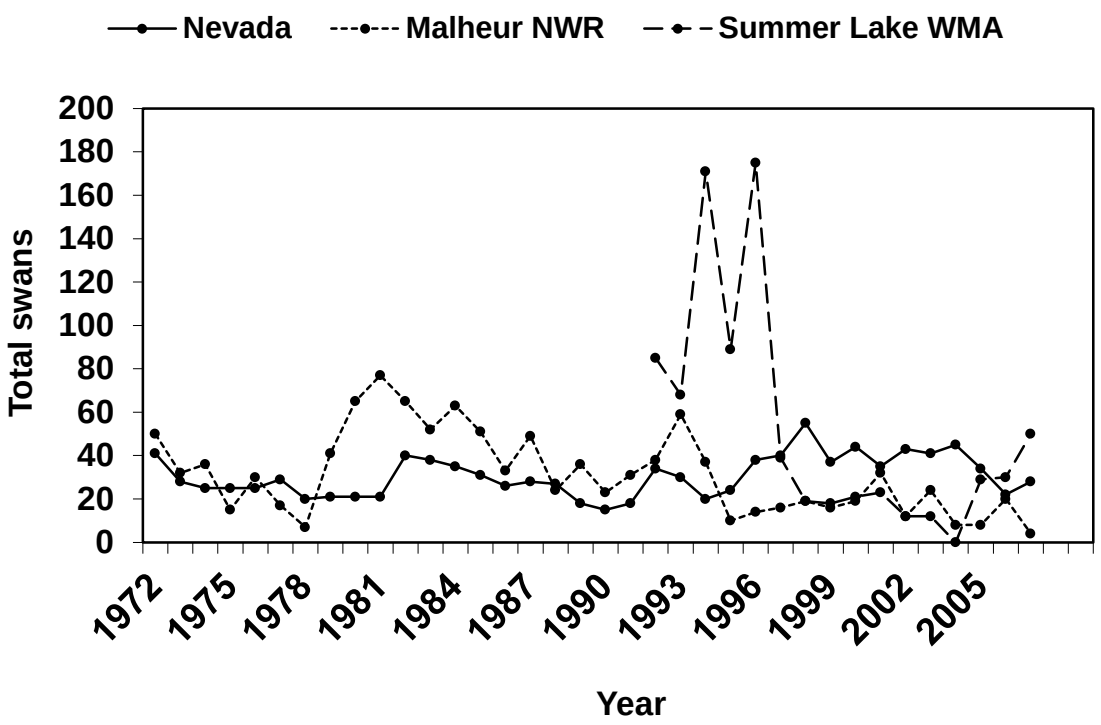


Figure 6. Results of Midwinter Surveys of the Rocky Mountain Population of Trumpeter Swans in Nevada, Malheur NWR, Oregon, and Summer Lake WMA, Oregon, 1972-2007.

From 2007 Winter Survey, Rocky Mountain Population of Trumpeter Swans, May 2007, USFWS, MBSP, Lakewood, Colorado.

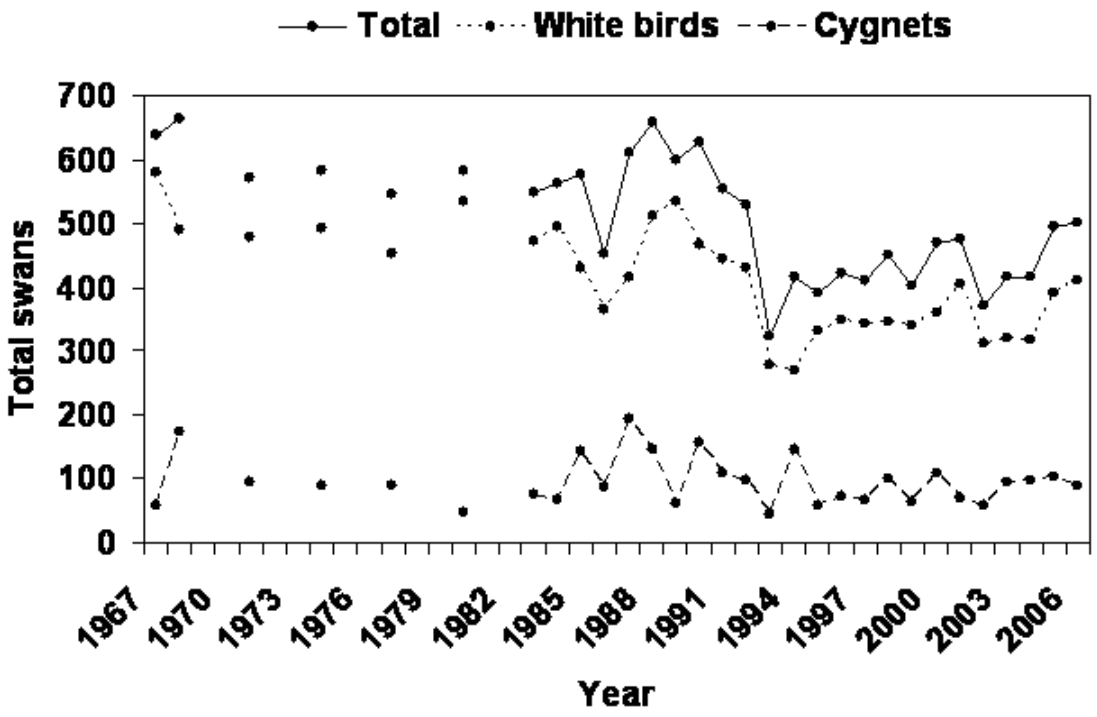


Figure 7. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in all U.S. flocks (Idaho, Montana, Nevada, Oregon, Utah, and Wyoming), 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

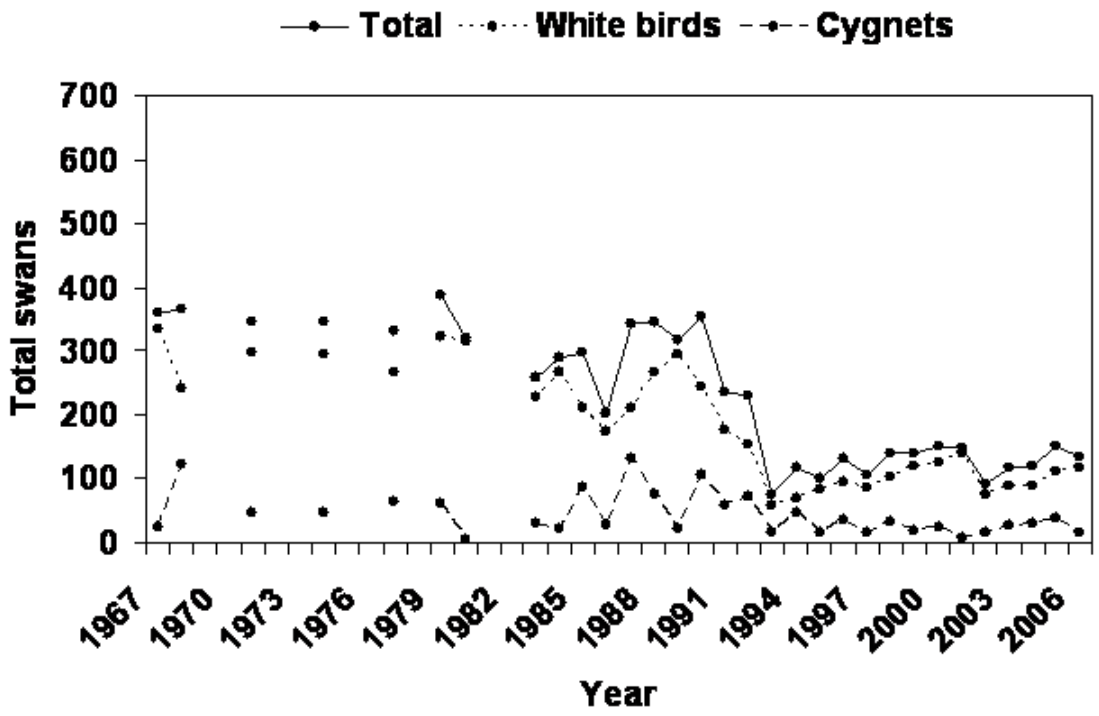


Figure 8. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Montana, 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

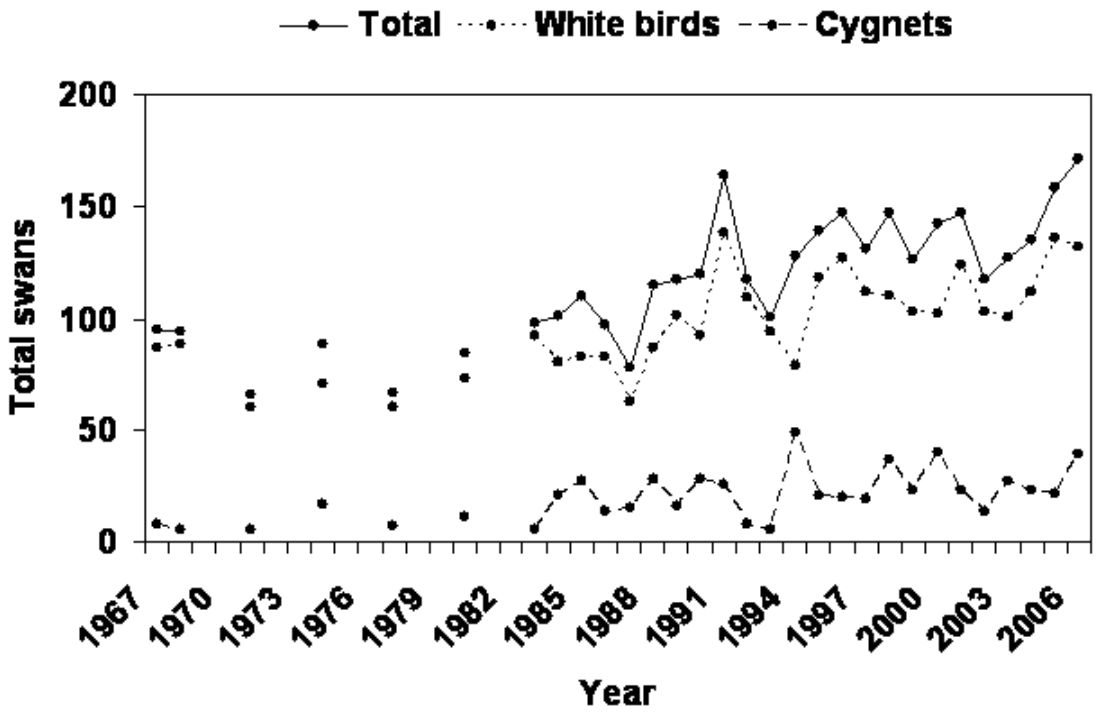


Figure 9. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Idaho, 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

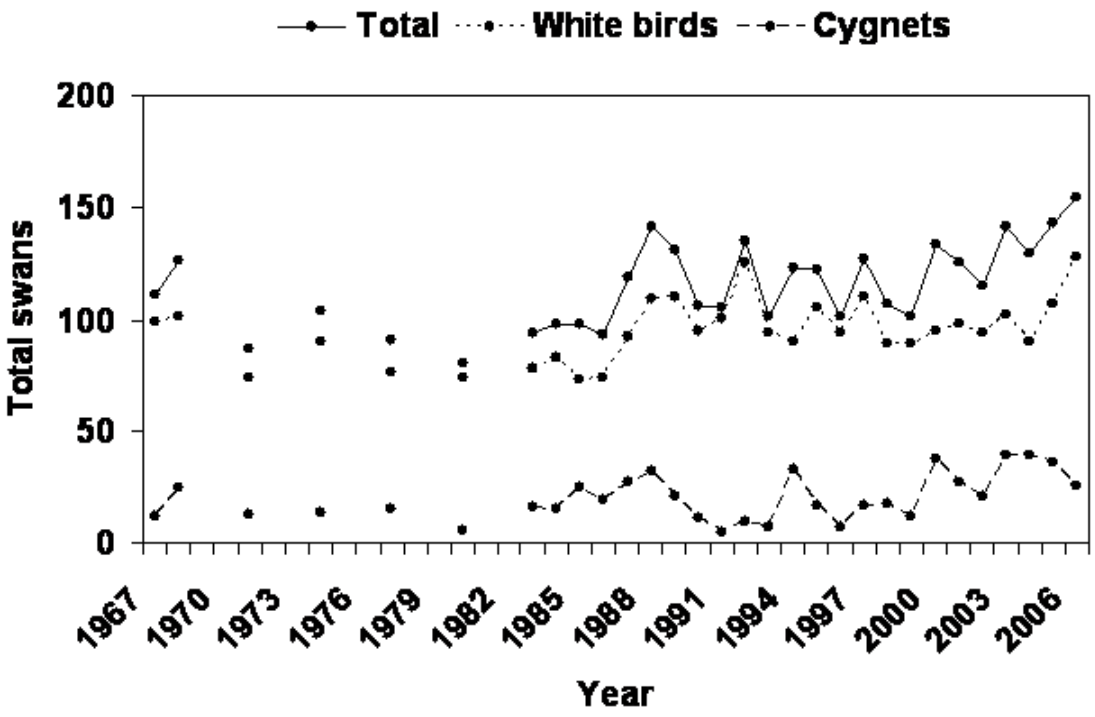


Figure 10. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Wyoming, 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

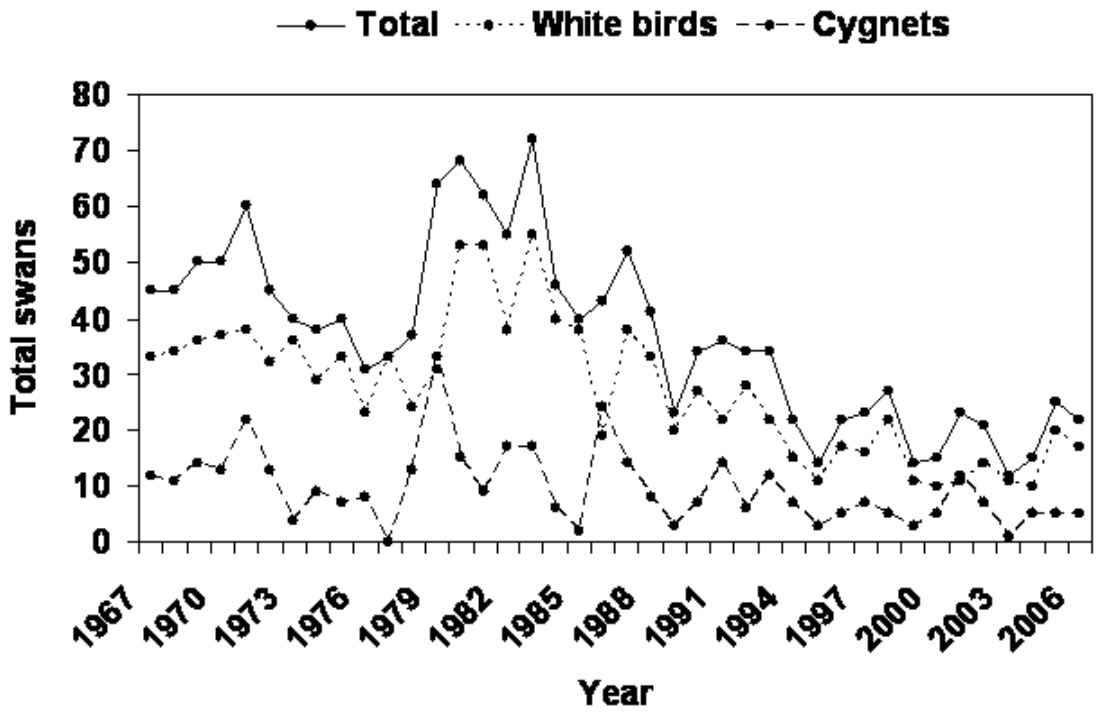


Figure 11. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Malheur NWR, Oregon, 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

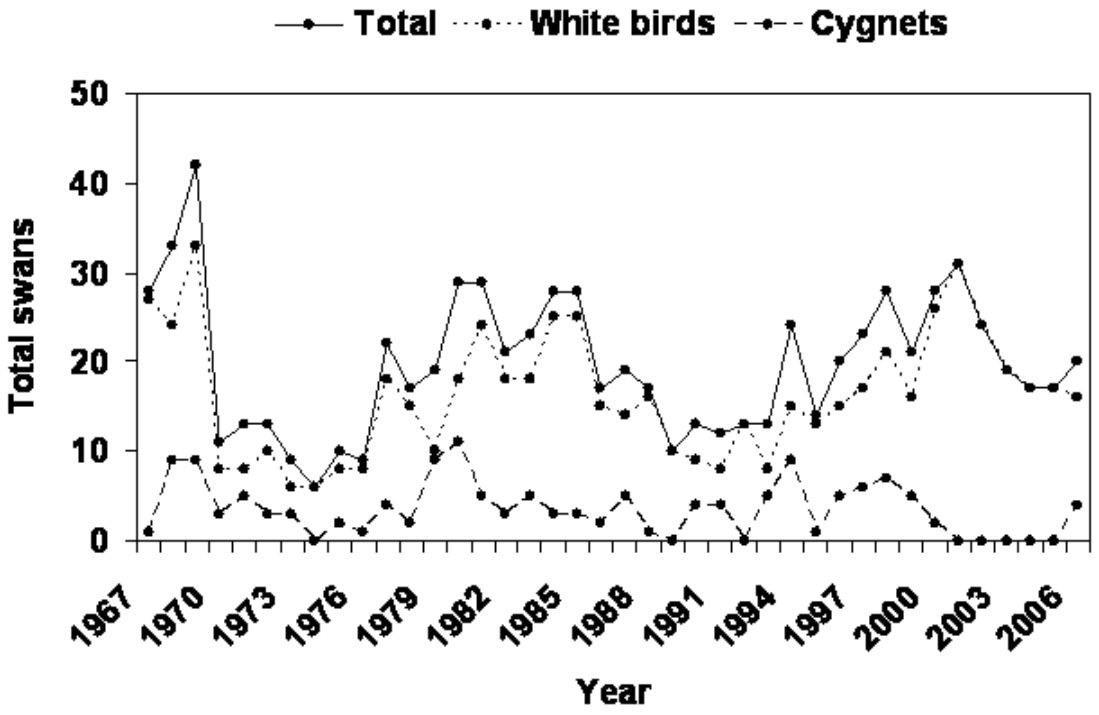


Figure 12. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Nevada, 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

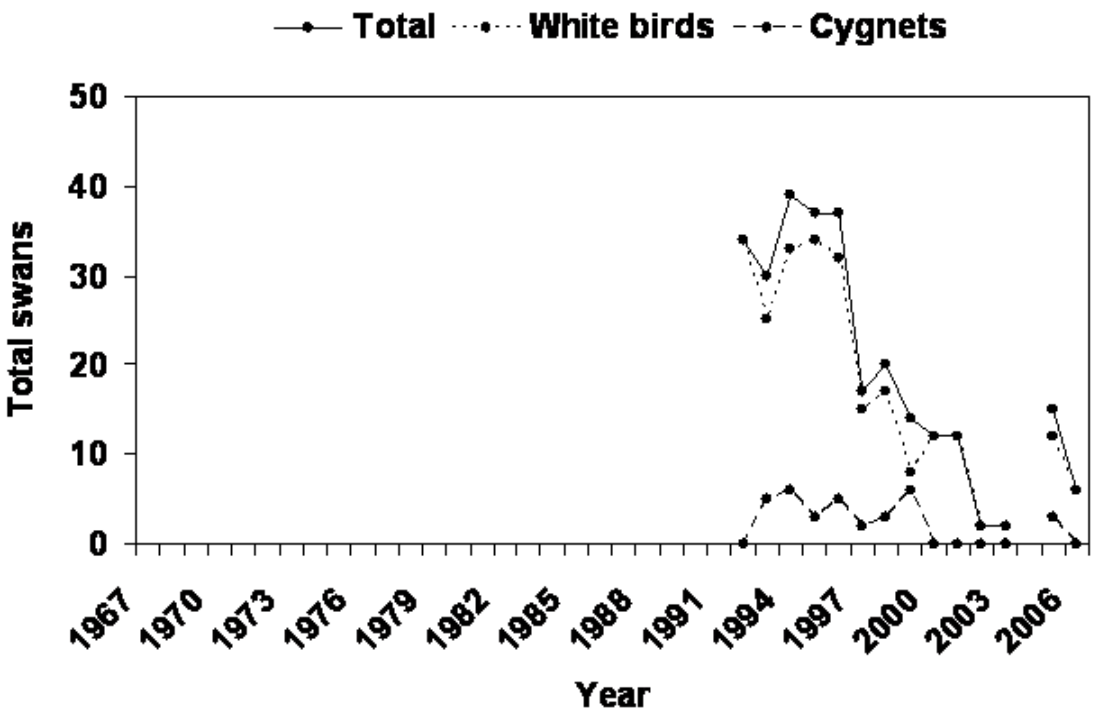


Figure 13. Results of Fall Surveys of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Summer lake WMA, Oregon, 1967-2006.

From 2006 Fall Trumpeter Swan Survey of the Rocky Mountain Population, U.S. Breeding Segment, November, 2006, USFWS, MBSP, Lakewood, Colorado.

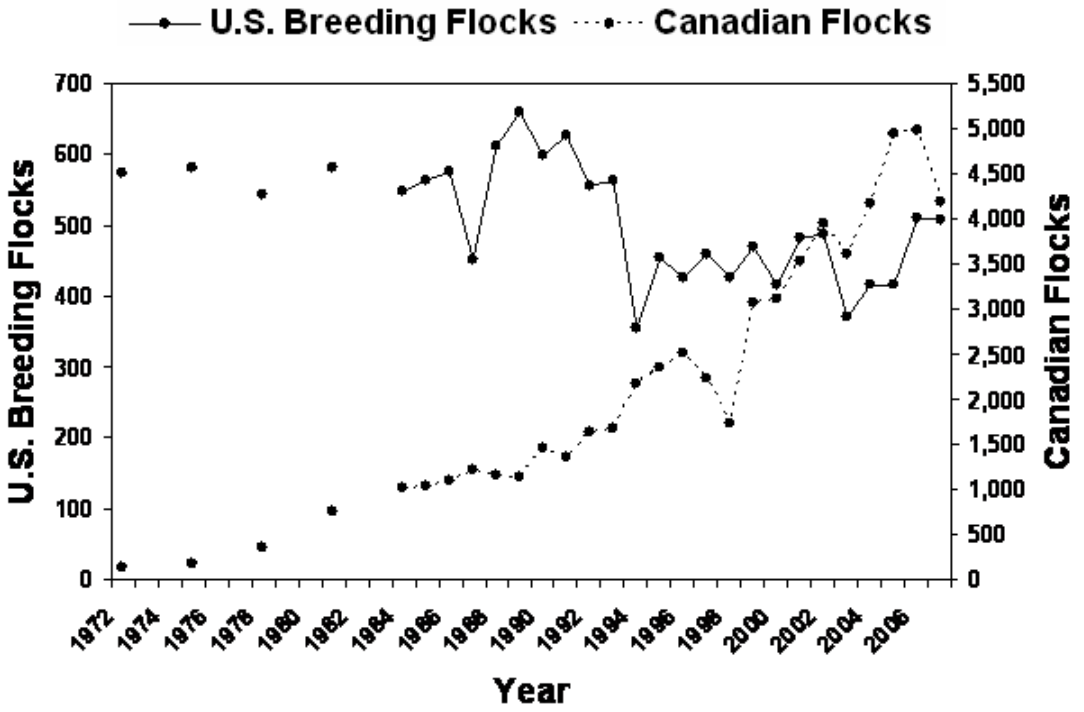


Figure 14. Trends of Rocky Mountain Population trumpeter swans (white birds, cygnets, and unknown age), U. S. and Canadian flocks, 1967-2007.

To expedite comparison between Midwinter and Mid-September surveys, data from the Midwinter Surveys (February) have been plotted on the year previous to their actual dates since they measure production and populations from the previous year (From 2007 Winter Survey, Rocky Mountain Population of Trumpeter Swans, May 2007, USFWS, MBSP, Lakewood, Colorado). Yellowstone National Park was not surveyed in 1998 due to weather.

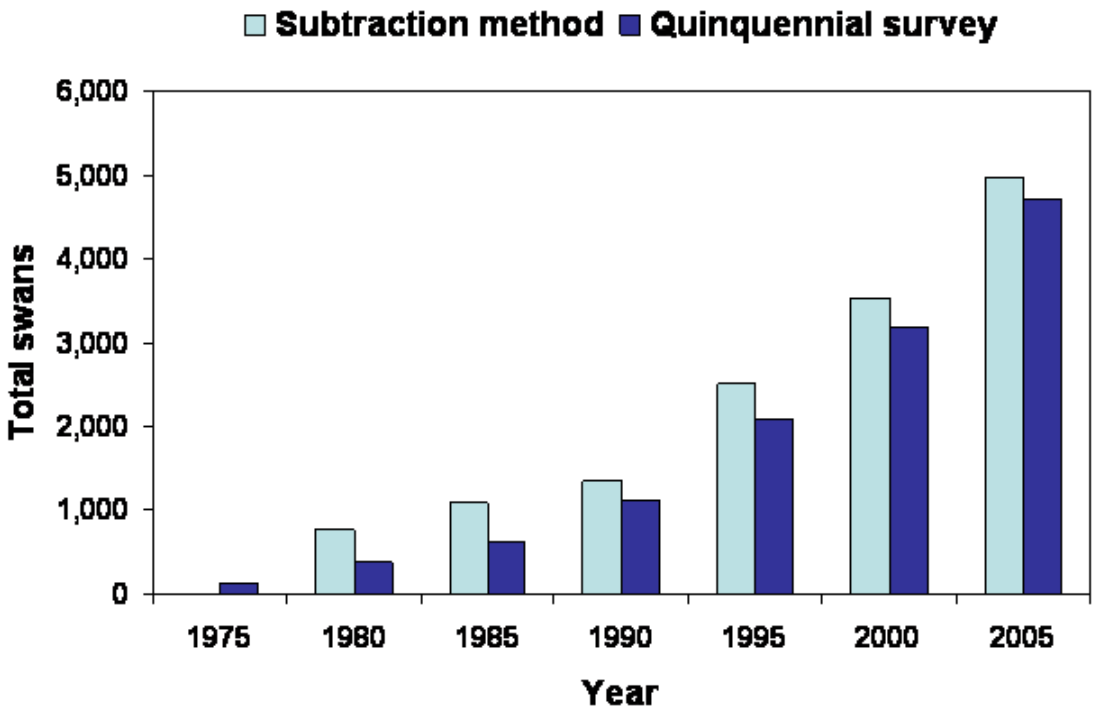


Figure 15. Comparison of estimates from annual surveys and the quinquennial survey, 1975-2005.

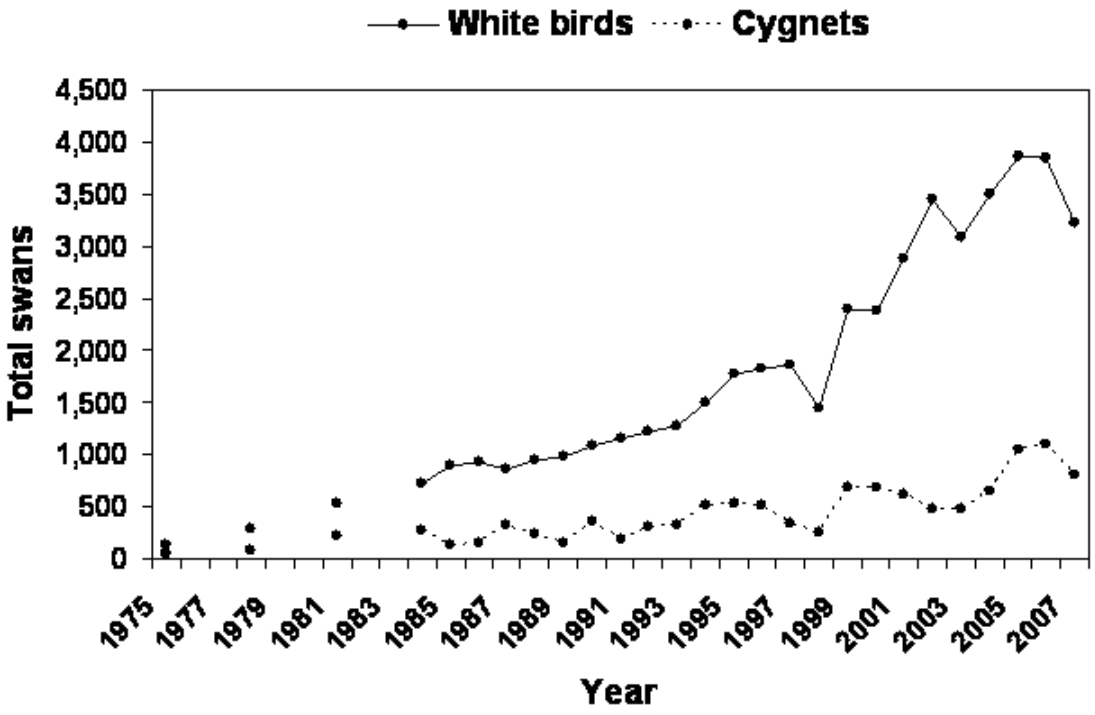


Figure 16. Estimates of the number of Rocky Mountain Population trumpeter swans (white birds and cygnets) in Canadian flocks, 1974-2007.

Data were derived from differences between Mid-September Surveys of resident, breeding flocks in the Tri-state Region and Midwinter Surveys the following February of the entire Rocky Mountain Population in the Tri-state Region. Yellowstone National Park was not surveyed in 1998 due to weather.

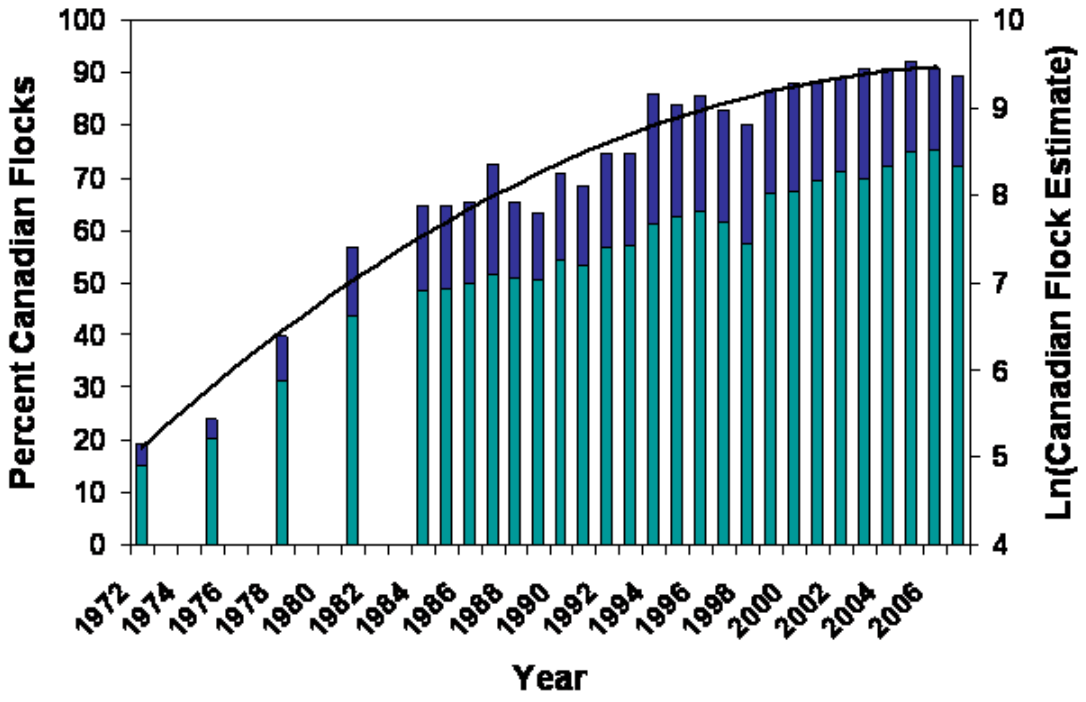


Figure 17. Percentage of the Rocky Mountain Population of trumpeter swans comprised of Canadian flocks, 1974-2007, derived from the Midwinter Survey.

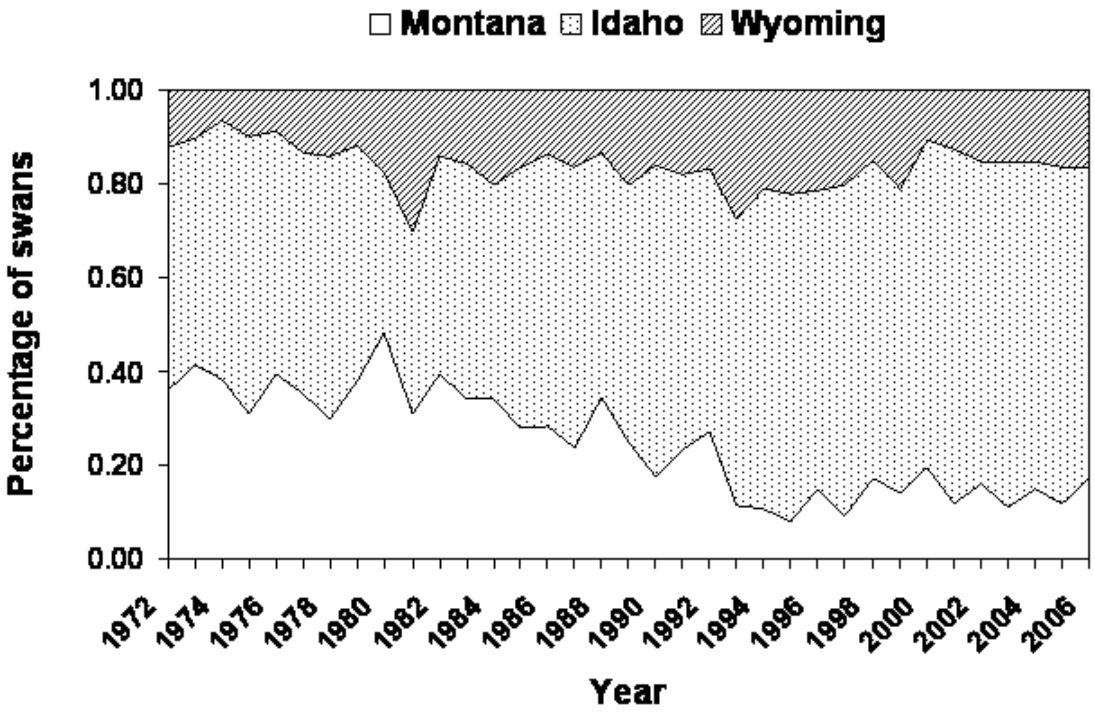


Figure 18. Proportions of total swans counted in each of the states comprising the Tri-state Region during the Mid-winter Trumpeter Swan Survey, 1972-2007.

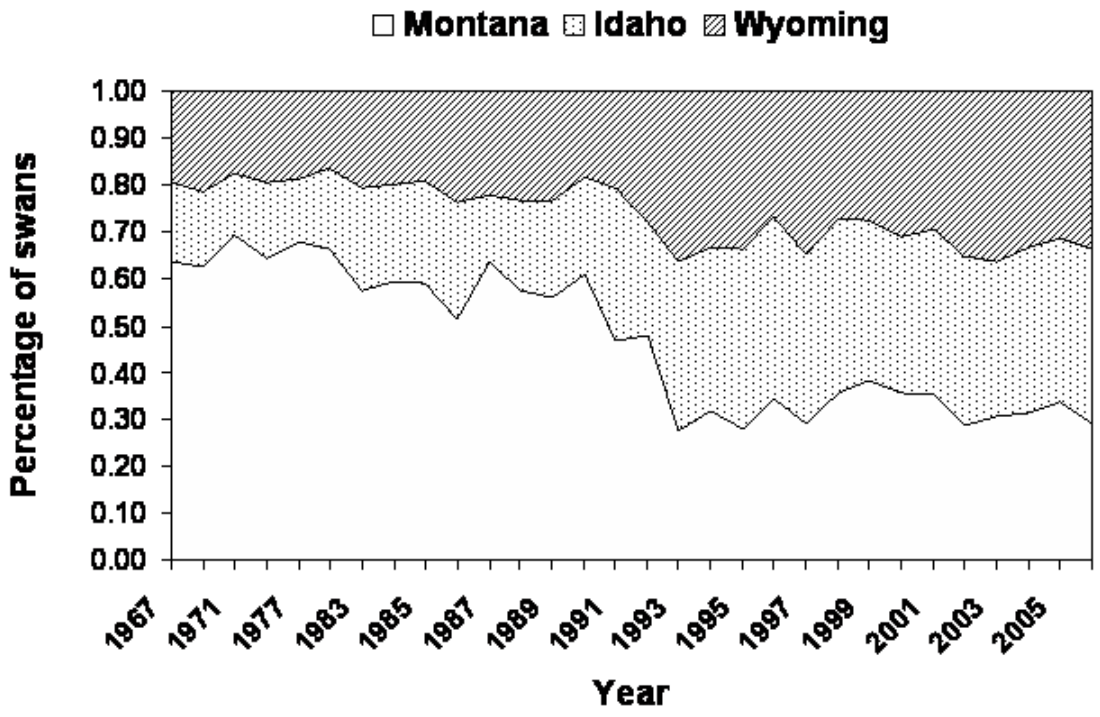


Figure 19. Proportions of total swans counted in each of the states comprising the Tri-state Region during the Fall Trumpeter Swan Survey, 1972-2007.

APPENDICES

APPENDIX 1. USFW Service Midwinter Surveys of the Rocky Mountain Population of trumpeter swans, 1972-2007.

	Montana			Idaho			Wyoming			Malheur NWR[a]			Summer Lake WMA[b]			Nevada[a]		
Year	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1972	209	14	223	303	14	317	[c]	[c]	70			50						41
1973	212	28	240	222	58	280	[c]	[c]	32			32						28
1974	233	40	273	282	109	391	38	7	45			36						25
1975	192	32	224	333	94	427	70	2	72			15						25
1976	253	34	287	308	67	375	62	1	63			30						25
1977	315	43	358	395	126	521	129	9	138			17						29
1978	194	68	262	392	96	488	109	15	124			7						20
1979	304	26	330	353	81	434	86	16	102			41						21
1980	374	80	454	250	70	320	143	22	165			65						21
1981	352	36	388	370	110	480	278	101	379			77						21
1982	390	90	480	429	137	566	133	39	172			65						40
1983	363	59	422	493	122	615	169	26	195			52						38
1984	389	109	498	503	162	665	236	61	297			63						35
1985	393	31	424	701	144	845	232	15	247			51						31
1986	380	73	453	744	183	927	180	43	223			33						26
1987	314	63	377	690	255	945	192	68	260			49						28
1988	438	153	591	694	209	903	182	46	228			24						27
1989	342	90	432	817	141	958	293	60	353			36						18
1990	319	38	357	1025	300	1325	247	78	325			23						15
1991	385	70	455	918	211	1129	286	61	347			31						18
1992	438	114	552	892	249	1141	312	34	346	25	13	38	42	43	85	32	2	34
1993	168	70	238	1020	246	1266	471	103	574	44	15	59	47	21	68	30	0	30
1994	199	48	247	1164	397	1561	390	98	488	30	7	37	84	87	171	13	7	20
1995	153	61	214	1391	475	1866	468	132	600	9	1	10	63	26	89	21	3	24
1996	319	82	401	1336	390	1726	474	108	582	11	3	14	129	46	175	23	15	38
1997	204	30	234	1555	272	1827	420	105	525	11	5	16	35	4	39	31	9	40
1998	290	68	358	1200	200	1400	266[d]	39[d]	305[d]	13	6	19	18	1	19	33	22	55
1999	335	153	488	1754	500	2254	609	119	728	[c]	[c]	16	16	2	18	29	8	37
2000	519	155	674	1881	513	2394	294	78	372	[c]	[c]	19	15	6	21	35	9	44
2001	373	96	469	2404	549	2953	421	74	495	[c]	[c]	32	16	7	23	31	4	35
2002	600	104	704	2636	357	2993	578	85	663	[c]	[c]	12	7[e]	5[e]	12[e]	41	2	43
2003	375	58	433	2490	382	2872	500	92	592	19	5	24	9[e]	3[e]	12[e]	34	7	41
2004	583	92	675	2591	563	3154	611	91	702	8	0	8	[c]	[c]	[c]	38	7	45
2005	508	119	627	2954	828	3782	685	196	881	8	0	8	19	10	29	32	2	34

Appendix 1. Continued.

	Montana			Idaho			Wyoming			Malheur NWR[a]			Summer Lake WMA[b]			Nevada[a]		
Year	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
2006	713	211	924	2714	873	3587	776	125	901	15	5	20	21	9	30	22	0	22
2007	466	49	515	2294	664	2958	844	180	1024	4	0	4	34	16	50	18	10	28

[a] Total counts not separated into white birds and cygnets prior to 1992.
[b] Swans first translocated to Summer Lake WMA in 1992.
[c] Counts not available.
[d] Count biased low because aerial survey not conducted in YNP due to hazardous weather; snowmobile count with incomplete coverage only.
[e] Count biased low due to incomplete survey coverage.

APPENDIX 2. Results of the Fall Survey of the Rocky Mountain Population/U.S. Breeding Segment of trumpeter swans, 1931-2007. Note that the USFW Service reports do not include data prior to 1967.

	Montana			Idaho			Wyoming			Malheur NWR			Summer Lake WMA[a]			Nevada		
Year	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1931	[b]																	
1932	20	9	29															
1933	17	9	26															
1934	16	26	42															
1935	30	16	46															
1936	30	26	56	0	0	0	36	17	53									
1937	36	51	87	0	0	0	41	26	67									
1938	46	51	97	0	0	0	47	4	51									
1939	58	59	117	12	0	12	53	17	70									
1940	67	49	116	7	5	12	43	14	57									
1941	74	54	128	19	0	19	47	15	62									
1942	71	53	124	24	0	24	46	15	61									
1943	126	34	160	46	9	55	47	15	62									
1944	137	61	198	22	0	22	47	12	59									
1945	146	52	198	16	0	16	48	14	62									
1946	181	62	243	23	0	23	51	10	61									
1947	179	52	231	24	0	24	60	8	68									
1948	199	85	284	26	0	26	63	21	84									
1949	233	75	308	16	5	21	72	23	95									
1950	187	47	234	31	7	38	73	23	96									
1951	285	89	374	46	18	64	85	18	103									
1952	340	67	407	60	10	70	68	16	84									
1953	355	57	412	20	14	34	97	28	125									
1954	412	40	452	38	7	45	118	36	154									
1955	366	48	414	24	16	40	101	31	132									
1956	374	48	422	26	14	40	81	19	100									
1957	247	57	304	27	4	31	85	28	113									
1958	358	62	420	48	23	71	105	45	150	21	4	25						
1959	379	59	438	44	10	54	109	30	139	23	0	23						
1960	294	50	344	95	23	118	98	16	114	10	14	24						
1961	257	29	286	47	19	66	130	12	142	23	3	26						
1962	225	76	301	45	18	63	83	9	92	13	3	16						
1963	229	138	367	63	32	95	89	12	101	26	17	43						

Appendix 2. Continued.

	Montana			Idaho			Wyoming			Malheur NWR			Summer Lake WMA[a]			Nevada		
Year	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1964	402	31	433	46	7	53	106	10	116	30	6	36						
1965	354	36	390	62	12	74	119	13	132	29	11	40						
1966	351	66	417	62	21	83	101	28	129	33	12	45				29	11	40
1967	334	25	359	87	8	95	99	12	111	33	12	45				27	1	28
1968	242	123	365	88	6	94	101	25	126	34	11	45				24	9	33
1969										36	14	50				33	9	42
1970										37	13	50				8	3	11
1971	297	49	346	60	6	66	74	13	87	38	22	60				8	5	13
1972										32	13	45				10	3	13
1973										36	4	40				6	3	9
1974	296	49	345	71	17	88	90	14	104	29	9	38				6	0	6
1975										33	7	40				8	2	10
1976										23	8	31				8	1	9
1977	267	64	331	60	7	67	76	15	91	33	0	33				18	4	22
1978										24	13	37				15	2	17
1979	324	63	387							31	33	64				10	9	19
1980	315	6	321	73	11	84	74	6	80	53	15	68				18	11	29
1981										53	9	62				24	5	29
1982										38	17	55				18	3	21
1983	228	32	260	92	6	98	78	16	94	55	17	72				18	5	23
1984	268	22	290	80	21	101	83	15	98	40	6	46				25	3	28
1985	212	87	299	83	27	110	73	25	98	38	2	40				25	3	28
1986	174	28	202	83	14	97	74	19	93	19	24	43				15	2	17
1987	210	133	343	63	15	78	92	27	119	38	14	52				14	5	19
1988	268	77	345	87	28	115	109	32	141	33	8	41				16	1	17
1989	294	23	317	101	16	117	110	21	131	20	3	23				10	0	10
1990	245	108	353	92	28	120	95	11	106	27	7	34				9	4	13
1991	176	60	236	138	26	164	100	5	105	22	14	36	2	0	2	8	4	12
1992	156	74	230	109	8	117	125	10	135	28	6	34	34	0	34	13	0	13
1993	60	16	76	94	6	100	94	7	101	22	12	34	25	5	30	8	5	13
1994	70	48	118	79	49	128	90	33	123	15	7	22	33	6	39	15	9	24
1995	84	17	101	118	21	139	105	17	122	11	3	14	34	3	37	13	1	14
1996	95	36	131	127	20	147	94	7	101	17	5	22	32	5	37	15	5	20
1997	88	18	106	112	19	131	110	17	127	16	7	23	15	2	17	17	6	23
1998	105	35	140	110	37	147	89	18	107	22	5	27	17	3	20	21	7	28

Appendix 2. Continued.

	Montana			Idaho			Wyoming			Malheur NWR			Summer Lake WMA[a]			Nevada		
Year	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total	White birds	Cygnets	Total
1999	120	21	141	103	23	126	89	12	101	11	3	14	8	6	14	16	5	21
2000	127	24	151	102	40	142	95	38	133	10	5	15	12	0	12	26	2	28
2001	140	9	149	124	23	147	98	27	125	11	12	23	12	0	12	31	0	31
2002	76	18	94	103	14	117	94	21	115	14	7	21	2[c]	0[c]	2[c]	24	0	24
2003	89	29	118	100	27	127	102	39	141	11	1	12	2[c]	0[c]	2[c]	19	0	19
2004	89	32	121	112	23	135	90	39	129	10	5	15				17	0	17
2005	112	40	152	136	22	158	107	36	143	20	5	25	12	3	15	17	0	17
2006	117	17	134	132	39	171	128	26	154	17	5	22	6	0	6	16	4	20
2007	157	41	198	113	15	128	113	59	172	11	0	11	0	0	0	17	1	18

[a] Swans translocated to Summer Lake WMA beginning in winter 1991.

[b] Blanks denote survey was not conducted.

[c] Incomplete count.

APPENDIX 3. Protocol for handling Trumpeter Swans for translocation and/or health monitoring.

Crates and sacks used in the translocation effort or for holding swans should only be used for swans. Crates and sacks used at one capture location should not be used at another capture location unless they are disinfected between sites. Crates and sacks should be disinfected between translocation years. A good disinfectant is commercially-available household chlorine bleach. This bleach can be diluted 1:10 with water and used to disinfect materials which contact the birds.

Veterinarians involved with the trumpeter swans should be requested to practice good bio-security measures. They should make the trumpeters the first stop of the day, wear fresh clothing (lab coats, etc.), and be cognizant of the possibility of the transfer of infectious agents from other cases (i.e., sick pet birds or poultry). Since it is difficult to control exposure within a veterinary clinic, it is preferable to have the birds examined outside (i.e., on the tailgate in the parking lot).

Until more is known about the Fish Springs NWR mortality, avoid exposure of trumpeter swans to other bird species (particularly gallinaceous birds). Handlers should not have any immediate association with gallinaceous birds prior to handling swans. This includes backyard chickens and captive-raised quail, pheasants etc.

Swans observed sick/moribund or injured during capture and handling should not be transported to a release site. Whether to transport birds for treatment and rehabilitation, release them at the capture site and attempt to monitor them, or euthanize them will have to be decided on an individual-case basis. The paramount consideration is to avoid spreading disease to any release site.

Swans that have been held at a rehabilitation facility or veterinary clinic for treatment and then released into the wild could carry disease. To minimize this risk, the operators of such facilities should be queried as to possible exposure to disease. If possible, cloacal swabs should be taken to check for salmonella and coccidiosis and release of the birds delayed pending the results.

Proficiency at blood and other sample collection should be achieved so that birds are handled minimally and the translocation effort is efficient and quick.

Any swans that die during capture, handling, or the post-release period should be sent to an appropriate laboratory for necropsy.

APPENDIX 4. Results of the Canadian Wildlife Service's late summer surveys of the Grand Prairie, Rocky Mountain Population trumpeter swan flock, 1959-2005.[a]

Year	Total no. lakes surveyed	Pairs with cygnets	Total pairs	Single and flocked adults	Total adults	Total cygnets	Total flock
1959	37	10	18	51	87	40	127
1960	36	9	14	42	70	38	108
1961	38	12	16	57	89	41	130
1962	39	8	19	35	73	36	109
1963	41	9	14	62	89	27	116
1964	38	7	16	58	90	14	104
1965	42	2	23	18	64	5	69
1966	42	7	21	19	61	24	85
1967[b]	42	7	20	4	44	24	68
1968	47	11	22	32	75	31	106
1969	43	6	13	47	73	13	86
1970	54	9	14	48	76	24	100
1971	55	11	24	31	78	36	114
1972	57	10	23	21	67	37	104
1973	60	19	29	11	68	55	123
1974	71	13	28	43	98	49	147
1975	79	12	31	22	84	37	121
1976	103	14	36	8	80	41	121
1977	113	25	31	26	88	80	168
1978	141 (14)	20 (0)	36 (3)	59 (0)	133 (6)	72 (0)	203 (6)
1979	123 (13)	17 (1)	41 (4)	15 (0)	97 (8)	58 (3)	155 (11)
1980	107 (13)	21 (2)	36 (3)	55 (5)	127 (11)	64 (8)	191 (19)
1981	110 (14)	21 (2)	39 (3)	80 (4)	158 (10)	74 (10)	232 (20)
1982	118 (13)	20 (1)	35 (6)	97 (0)	167 (12)	65 (2)	232 (14)
1983	159 (13)	23 (2)	58 (7)	38 (0)	154 (14)	68 (9)	222 (23)
1984	157 (0)	37 (0)	63 (0)	97 (0)	225 (0)	118 (0)	341 (0)
1985	174 (30)	25 (4)	53 (10)	85 (0)	191 (20)	93 (16)	284 (36)
1986	192 (79)	33 (8)	57 (14)	109 (3)	223 (31)	124 (24)	347 (55)
1987	194 (0)	29 (0)	52 (0)	178 (0)	282 (0)	101 (0)	383 (0)
1988	190 (0)	32 (0)	56 (0)	177 (0)	289 (0)	112 (0)	401 (0)
1989	190 (0)	28 (0)	63 (0)	161 (0)	287 (0)	81 (0)	368 (0)
1990	164 (70)	30 (5)	67 (20)	99 (6)	233 (46)	88 (21)	321 (67)
1991	170 (0)	34 (0)	56 (0)	57 (0)	169 (0)	98 (0)	267 (0)
1992	171 (19)	53 (5)	78 (7)	92 (0)	248 (14)	211 (20)	459 (34)
1993	142 (0)	37 (0)	62 (0)	141 (0)	265 (0)	128 (0)	393 (0)
1994	149 (0)	32 (0)	58 (0)	196 (0)	312 (0)	107 (0)	419 (0)
1995	191 (55)	32 (5)	71 (17)	202 (3)	344 (37)	103 (14)	447 (51)
1996	172 (0)	26 (0)	64 (0)	140 (0)	268 (0)	86 (0)	354 (0)
1997	128 (0)	20 (0)	52 (0)	80 (0)	184 (0)	69 (0)	253 (0)
1998	124 (0)	36 (0)	28 (0)	23 (0)	151 (0)	123 (0)	274 (0)
1999	182 (0)	46 (0)	80 (0)	117 (0)	277 (0)	136 (0)	413 (0)

Appendix 4. Continued.

Year	Total no. lakes surveyed	Pairs with cygnets	Total pairs	Single and flocked adults	Total adults	Total cygnets	Total flock
2000	329 (81)	59 (12)	112 (27)	180 (8)	404 (62)	204 (39)	608 (101)
2001	43 (0)	12 (0)	22 (0)	205 (0)	249 (0)	41 (0)	290 (0)
2002	20 (0)	5 (0)	7 (0)	25 (0)	49 (0)	26 (0)	75 (0)
2003							
2004							
2005	259 (98)	96 (14)	112 (34)	267 (32)	703 (128)	310 (46)	1013 (174)

[a] Data were assembled by G. Beyersbergen, G. Holton, L. Shandruk, and B. Turner, from the original CWS flight reports. Since 1978, most surveys have included contiguous portions of British Columbia. Therefore, to aid between-year comparisons, the data since 1978 are presented in the format: Alberta survey results (British Columbia survey results).

[b] Incomplete/ partial surveys 2001 and 2002. No surveys 2003-2004.

APPENDIX 5. Status of Rocky Mountain Population trumpeter swan flocks as determined by summer, range-wide surveys in 1985, 1990, 1995, 2000, and 2005.

	1985			1990			1995			2000			2005		
Location	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total
California (Lake Klamath)							2	0	2	0	0	0	0	0	0
Idaho	83	27	110	102	28	130	118	21	139	102	40	142	136	22	158
Montana	212	87	299	245	108	353	86	17	103	127	24	151	112	40	152
Nevada (Ruby Lakes NWR)	23	3	26	8	4	12	15	5	20	26	2	28	17	0	17
Oregon	36	2	38	19	7	26	47	6	53	22	5	27	32	8	40
Washington	9	1	10	3	0	3	2	0	2	1	0	1	0	0	0
Wyoming	73	25	98	95	11	106	105	17	122	95	38	133	107	36	143
U.S. flocks subtotal	436	145	581	472	158	630	375	66	441	373	109	482	404	106	510
Alberta	228	112	340	306	160	466	563	216	779	668	327	995	1173	558	1731
British Columbia	59	27	86	190	104	294	227	83	310	246	123	369	576	203	779
Northwest Territories	51	24	75	124	64	188	161	59	220	204	96	294	327	88	415
Saskatchewan	4	2	6	2	1	3	1	0	1	0	0	0	0	0	0
Yukon	87	20	107	136	30	166	**493**[a]	**273**[a]	**766**[a]	1057	469	1526	1194	599	1793
Canadian flocks subtotal	429	185	614	758	359	1117	1445	631	2076	2175	1015	3184	3270	1448	4718
RMP summer total	865	330	1195	1230	517	1747	1820	697	2517	2548	1124	3666	3674	1554	5228

[a] A new survey was designed in 1995 with the following objectives: (1) allow estimation of the total number of trumpeter swans in the Yukon with 95% confidence limits of plus or minus 30%; (2) determine the growth of the population at 5-year intervals; (3) document the range expansion; and (4) achieve these objectives with a relatively stable amount of resources (i.e., not require resources to greatly increase as the population increases). A stratified random sample design was chosen patterned after the Alaska trumpeter swan survey, using National Topographic Survey 1:50,000 map sheets as the sample units. All suitable habitats were searched, if feasible, on each selected map sheet. The data collected were then used to produce an estimated population of trumpeter swans in the Yukon (Pacific Coast and Rocky Mountain Population separated). Therefore, the figures shown in bold represent an estimated population size rather than the actual number of birds observed and an exact comparison with previous years is not possible.

APPENDIX 6

U. S. FISH AND WILDLIFE SERVICE'S

ENVIRONMENTAL ASSESSMENT ON

A PROPOSAL TO ESTABLISH OPERATIONAL GENERAL SWAN

HUNTING SEASONS IN THE PACIFIC FLYWAY

(Finding of No Significant Impact Only)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

Decision and Finding of No Significant Impact

Proposal to Establish Operational General Swan Hunting Seasons in the Pacific Flyway

Introduction

The U.S. Fish and Wildlife Service has authorized take of a limited number of Trumpeter swans in the previously existing Tundra Swan seasons in the Pacific Flyway (excluding Alaska) since the 1995-1996 hunting season. The regulations establishing this limited take were based on three previous Environmental Assessments (Bartonek et al.:1995-1996 through1999-2000, Trost et al. 2000-2001, Trost et al. 2001-2002 through 2002-2003) and previous Findings of No Significant Impact regarding these Environmental Assessments issued by the Service. The Service established the seasons in Montana and Nevada as operational in the 2001 Environmental Assessment but continued the season as experimental in Utah while mandating a review after the 2002-2003 hunting season. Therefore, the Service updated and reissued both a draft and final Environmental Assessment on this issue. The Service and cooperators continued their annual survey efforts and monitoring programs, and this information is made available in the updated draft and final Environmental Assessment.

Several administrative and judicial actions have occurred since the 2001 Environmental Assessment was issued that relate to the current Environmental Assessment:

A. On August 22, 2000, the Service was petitioned to list a portion of the RMP of Trumpeter Swans as either a threatened or endangered distinct population segment (DPS) under the provisions of the Endangered Species Act (1973, as amended). The petitioners also requested that the Service consider emergency listing of the Tristate flock at this time. The Service acknowledged receipt of the petition and informed the petitioners that listing funds were not then available for processing of administrative petition findings. Additionally, the Service stated that the population trend data for the RMP of Trumpeter Swans indicated that there was no compelling evidence to indicate that emergency listing was appropriate. Subsequently, the Service issued the 90-Day Finding on this petition on January 28, 2003 (Federal Register 68(18): 4221-4228). This finding concludes: "On the basis of the data in our files, we find that the Tristate Area flock of Trumpeter Swans does not constitute a DPS in the meaning of the Act and, therefore, is not a listable entity." Additionally, the finding concludes: "Therefore, we conclude that the Trumpeter Swan is not in need of additional protection beyond the current provisions of the MBTA."

B. On October 3, 2001, the Fund for Animals, the Biodiversity Legal Foundation, the Utah Environmental Congress, the Humane Society of the United States, and two wildlife enthusiasts (collectively, "the plaintiffs") filed a complaint against the U. S. Fish and Wildlife Service and the Department of the Interior (collectively, "the defendants"), challenging the Service's actions under MBTA, the ESA, and NEPA. On February 25, 2003, The United States District Court for the District of Columbia issued its finding:

> The defendants authorization of the Trumpeter Swan quota was consistent with the MBTA and was not arbitrary or capricious.
>
> 2. The defendants authorization of the Trumpeter Swan quota without an EIS did not violate NEPA and was not arbitrary or capricious.
>
> 3. The challenge to the defendant's failure to act on the petition to list the Trumpeter was moot.
>
> 4. The Service's response to the plaintiffs request for an emergency listing was without adequate explanation and ordered the Service to provide such explanation within 60 days to the plaintiffs.

At present, the fourth point is under judicial review because the Service believes the issue is rendered moot by the 90-day finding. In addition, the plaintiffs have filed an appeal of the District Court's ruling. However, unless or until the District Court ruling is reversed, the Service will act in accordance with it.

C. In July, 2002, the Pacific Flyway Council completed the requested (Trost et al. 2000, Federal Register 65(188): 58517) Trumpeter Swan Implementation Plan, a companion document to the Flyway Council's 1998 management plan. Progress toward the tasks identified by the cooperators in this plan have been recently described by Hemker (in press).

D. The U.S. Court of Appeals for the District of Columbia has recently determined that Mute Swans should be included on the list of species covered by the MBTA (*Hill v. Norton*, 275 F. 3d 98, D.C. Cir. 2001). Therefore, this action proposes the inclusion of Mute Swans in the general swan season being proposed for the Pacific Flyway.

E. On July 30, 2003, the Service responded to an alleged violation of the Information Quality Act in the preparation of the 90-day finding referenced in **A** above. The Service concluded: "The Service has conducted an analysis of issues raised in your IQA request. You propose that we withdraw our 90-day finding. However, your allegations do not provide any information that would cause us to revise our conclusion that the petition is not substantial. Based on

the above analyses, we see no new information in your request that would lead us to conclude that the Tristate Area Flocks of trumpeter swan are either discrete or significant to the rest of the taxon within the meaning of the ESA. As a result of our analysis, we find that no correction of information is warranted."

Purpose

The purpose of this proposed action is to establish regulatory options and management direction for Trumpeter (*C. buccinator*), Tundra (*C. columbianus*) Swans, and Mute Swans (*C. olor*), based on past experience with allowing a limited take of Trumpeter Swans in the existing permit Tundra Swan hunting season in the Pacific Flyway. In addition, additional information gathered over the past two years is used to reassess Trumpeter Swan population status and the potential impact of limited hunting seasons.

2. Background

A legal season that also permitted the take of a limited number of Trumpeter Swans in the Pacific Flyway was instituted in 1995. Prior to that time and beginning in 1961 a Tundra Swan season had been in effect. During the Tundra Swan seasons, it was known that some number of Trumpeter Swans were taken by swan hunters who mistook them for Tundra Swans. This limited take was authorized in an attempt to reconcile conflicting strategies for managing two swan species in the Pacific Flyway. The conflicting strategies are: (1) to enhance the winter range distribution of the less abundant Rocky Mountain Population (RMP) of Trumpeter Swans by severely restricting or eliminating swan hunting in portions of the Pacific Flyway currently open to hunting these species, and (2) to optimize hunting of the more numerous and widely distributed Western Population (WP) of Tundra Swans in the Pacific Flyway.

The U.S. Fish and Wildlife Service (Service) issued a finding of no significant impact in August of 1995 and again in July of 2000 with respect to these seasons in two previous Environmental Assessments (Bartonek et al. 1995, Trost et al. 2000). The proposed actions in these Environmental Assessments represented a balance between the two competing management strategies by establishing a general swan season in portions of Montana, Utah, and Nevada that allowed the taking of any species of swan (*Cygnus* sp.), subject to certain conditions:

(1 a limited, but biologically acceptable, quota on the take of Trumpeter Swans,

(2) modification of the already limited take and restricted seasons on Tundra Swans to enhance the likelihood that Trumpeter Swans would be successful in expanding their winter range, and,

(3) the development and implementation of a program to monitor the effectiveness of this action.

Note: At the time of the previous Environmental Assessments, the District Court ruling described in **D** above had not occurred; thus, previous Assessments did not address Mute Swans as they were not thought to be subject to Federal regulation at that time.

3. Issues

The following issues were identified during the interagency and public involvement phase of EA development:

Impacts of limited harvest on the Rocky Mountain Population of Trumpeter Swans.
Impacts of limited harvest on Trumpeter Swans nesting in the Tristate Region of Montana, Wyoming and Idaho.
Impacts of limited harvest on Trumpeter Swans nesting in Yellowstone National Park.
Impacts of limited Trumpeter Swan harvest on efforts to expand the wintering distribution of the Rocky Mountain Population of Trumpeter Swans.
Impact of field identification difficulty between Trumpeter and Tundra Swans.
Impact of adequacy of harvest management monitoring programs.
Population status of the Rocky Mountain Population of Trumpeter Swans.
Population status of Trumpeter Swans nesting within the Tristate Region of Montana, Idaho, and Wyoming.
Adequacy of plans/programs directed at expanding the winter distribution of Rocky Mountain Population of Trumpeter Swans.

These issues were determined to be important and were used to focus the environmental analysis and compare the impacts of the alternatives.

4. Decision and Rationale

The alternative courses of action (Alternatives) were developed with input from the cooperating agencies and the public, and were analyzed in the EA in concert with the issues noted above in item 3. A summary of the impacts and the reasons for selecting or not selecting the alternatives are discussed.

Actions Common to All Alternatives:

Although not directly related to the issue of hunting seasons, the Service will continue to provide a leadership role in attempting to enhance Trumpeter Swan status and breeding distribution within the Pacific Flyway, through increased efforts directed at establishment of breeding Trumpeter Swans in suitable habitats throughout the Pacific Flyway.

The Service would also continue to support cooperative efforts to address the winter distribution issues by working with State, non-governmental organizations (NGO) and individual partners. The Service would support limited winter capture and translocation on a case-by-case basis when circumstances developed that seemed to warrant such activity. The Service does not plan to employ winter translocations as the primary method to address the winter distribution problem of RMP Trumpeter Swans. Rather, translocation will be employed as a method to limit risk to swans from direct over-winter mortality, on an as-needed basis.

Continued progress toward development and implementation of the requested Implementation Plan (Trost et al. 2000, FR Vol. 65, No. 188, pg 58517) has occurred. The Service has completed its portion of this plan (Appendix A) and believes the actions outlined in this plan can help address concerns for the number of swans nesting in the Tristate Area and help establish new winter distribution patterns. Evidence suggests current and past management activities have contributed toward improving the winter distribution situation (Bouffard 2000). We expect that additional actions will continue to improve the status and distribution of RMP Trumpeter Swans. Implementation efforts will be continued by the Service under each of the alternatives to the greatest extent possible. We expect minimal to no impact on Mute Swans as they are not known to occur in the hunt areas.

Alternative 1: Proposed Action

The Service would continue to establish a hunting season for Tundra Swans, with an authorization of a small take of Trumpeter Swans in designated portions of Montana, Utah and Nevada, within the Pacific Flyway. Constraints imposed upon swan hunting seasons described in the Supplemental Environmental Assessment on this issue (Trost et al. 2000) would be continued. Specific areas open to swan hunting in Montana, Utah and Nevada would remain as defined under the Preferred Alternative in the Supplemental Environmental Assessment on this issue (Trost et al. 2000).

Alternative 2: No Action Alternative

Under the No Action Alternative, the management scenario used prior to 1994 would be re-instituted. The Service would continue to establish open seasons on Tundra Swans in all of Utah and parts of Montana and Nevada, while not allowing take of Trumpeter Swans. There would be no closure of areas where Tundra and Trumpeter Swans overlap in their fall/winter distribution.

Alternative 3:

A Under Alternative 3, the Service would close areas to Tundra Swan hunting in those parts of Montana, Utah, and/or Nevada that are likely to be used by Trumpeter Swans.

5. Public Involvement

This Environmental Assessment is an expanded and revised version of three previous Environmental Assessments (Bartonek et al. 1995, Trost et al. 2000, Trost et al. 2001). Extensive consultations were conducted in the development and implementation of these original Environmental Assessments. Previous consultations are summarized in those documents. Service representatives have conducted discussions in conjunction with annually scheduled Flyway meetings and at the Trumpeter Swan Society Conference, September 15-18, 1999, in Idaho Falls, Idaho, where this issue was discussed at length, and again at The Trumpeter Swan Society Meeting in Vancouver, British Columbia, February 5-8, 2003. Additional input has been received from numerous groups and organizations. Two public meetings were held in Idaho Falls, Idaho, and Salt Lake City, Utah, specifically to accept public comments on the Supplemental Environmental Assessment prepared for the 2000-2001 hunting season. The Service has continued to receive comment on the issue of management of RMP Trumpeter Swans from various public and private sources and has considered those comments in preparing the pre-decisional EA.

A notice of availability of the pre-decisional EA was published in the Federal Register on May 16, 2003 (FR Vol 68. No. 95 page 26642). In addition, the pre-decisional EA was posted on the Division of Migratory Bird Management's web page and mailed to all organizations and private individuals who requested copies.

All public comments were reviewed carefully by the Service. The comments were considered in light of the analysis in the EA. The EA addressed all substantive comments received during the 30-day comment period.

FINDING OF NO SIGNIFICANT IMPACT

A careful review of the EA indicates that there will not be a significant impact on the quality of the human environment as a result of this proposal under the meaning of section 102(2)(C) of the National Environmental Policy Act. I agree with this conclusion, and therefore, determine that an Environmental Impact Statement (EIS) will not be prepared. This determination is based on consideration of the following factors:

1 The proposed activities will occur in isolated and localized areas within a limited number of counties in three States open to swan hunting. The proposed activities are not national or regional in scope.

2. The proposed activities will not significantly affect public health and safety. Swan hunting is a voluntary activity that has no affect on public health and safety.

3. The proposed activities will not have an impact on unique characteristics of the geographic area, such as historical or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecological critical areas. The nature of the proposed action will not affect the physical environment or any historic or cultural resources of national park lands (pg 25-26).

4. The effects on the quality of the human environment of the proposed activities are not highly controversial. The Service acknowledges opposition to the proposed activities but concludes that this opposition does not rise to the level of significant controversy regarding the impacts of the proposed action. The Service notes that those voicing opposition to the Service's Preferred Alternative do not provide data or evidence to refute the numeric estimates of loss (pg 20-22) and the related potential for distributional impacts (pg 22-24), which the Service has concluded are not of a magnitude to threaten the RMP Trumpeter Swans, or any component of this population suggested by those in opposition.

5. The possible effects of the proposed activities on the quality of the human environment are not highly uncertain and do not involve unique or unknown risks. The Service assessment has determined that the number of birds to be taken under the proposed action is small and below any reasonable potential for adverse impact under even a worse case scenario (pg 20-22). Additionally, the Service implemented further reductions on swan seasons in Utah in 2000, and proposes to maintain these restrictions until management objectives are met to further reduce any potential for negative impacts (pg ADD THIS).

6. The proposed activities do not establish a precedent for actions with future significant effects or represent a decision in principle about a future consideration. Regulations with regard to take in sport hunting seasons are determined annually and all waterfowl harvest regulations are reviewed, based on new biological information, prior to finalizing the annual decision.

7. There are no significant cumulative effects identified by this assessment. Managed and limited harvest of swan populations has been shown to be consistent with long term population maintenance and enhancement and the action is not irreversible.

Appendix 6. Continued.

8. The proposed activities will not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor will it cause a loss or destruction of significant scientific, cultural, or historical resources. Managed sport harvest does not cause the loss of cultural or historic resources.

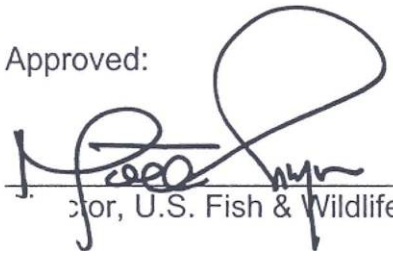
9. The proposed activities will fully comply with the Endangered Species Act of 1973, as amended. The proposed alternative does not include the take of any Federally listed species, and annual hunting regulations undergo section 7 regulatory review.

10. There are no irreversible or irretrievable resource commitments identified by this assessment, except for a minor consumption of fossil fuels for routine operations.

11 The proposed activities will not threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

For additional information concerning this decision, please contact:

Approved:



Deputy ctor, U.S. Fish & Wildlife Service

8.25.03
Date

APPENDIX 7

INFORMATION ON HEALTH ISSUES RELATIVE TO ROCKY MOUNTAIN POPULATION TRUMPETER SWAN TRANSLOCATIONS

Provided by the National Wildlife Health Center,

U. S. Geological Survey,

October 21, 1996

Risk Assessment and Health Monitoring Recommendations for Trumpeter Swan Translocations

Prepared By: Kimberli Miller, DVM
National Wildlife Health Center
October 21, 1996

The basic goal of any translocation or reintroduction project is to establish sustainable populations in a new or previously inhabited environment. An important concept to remember is that when an animal is moved from one site to another, all the bacteria, viruses, and internal and external parasites that animal may carry are transported right along with it. A health monitoring program cannot eliminate all disease risks or guarantee success, but it can help to improve the odds for a successful translocation effort by identifying and attempting to minimize detrimental disease impacts in all phases of the project. Consideration must be given to diseases previously encountered at the site of origin, health risks during translocation activities, and potential disease risks at the release site. The following is a list of factors to consider when developing a translocation program.

Factors to consider include:

1. Source Population.

    A. Health history of the source flock.
    B. Health history of birds utilizing the same habitat.
    C. Necessary health screening procedures prior to translocation given the health status of the flock.

2. Release Site.

    A. Health history of birds previously or currently in the area.
    B. Availability and abundance of suitable food and water sources and nesting habitat.
    C. Health monitoring procedures.
    D. Size of existing population and hierarchy, possibility of competitive exclusion and inter- or intra-species conflict.

3. Translocation Activities and Release.

    A. Animal welfare and health requirements for transportation to the release site. Example—proper use of immobilizing drugs if necessary and requirements for food, water, cage size while in transit.
    B. Bio-security measures for transportation equipment and personnel.
    C. Available quarantine site if necessary or feasible.

4. Personnel.

    A. Outside contact of personnel with pet birds or domestic poultry and the health

status of those birds. Organisms carried by pet birds and domestic poultry could pose a risk to trumpeter swans.

B. Knowledge of bio-security measures and understanding that strict bio-security measures will help prevent the mechanical transfer of disease organisms.

C. Training in correct animal handling and sample collection techniques.

5. Overall.

A. Identification of wildlife disease professionals available for health advice on the project.

B. Identification of diagnostic services for health monitoring and medical evaluation of sick and dead birds.

C. Disease contingency plan for dealing with a disease outbreak during any stage of the project.

Assessment of Risk

Disease Risks in Idaho Population of Trumpeter Swans

From 1975 through 1996, the national Wildlife Health Center (NWHC) received 533 trumpeter swan carcasses and samples. Sixty-one were submitted from Idaho. Common diagnostic findings among swans submitted from Idaho include parasitism, emaciation, lead poisoning, and trauma/gunshot. Concurrent disease processes may have been present in a single carcass. Two swans submitted in 1985 from Harriman State Park were diagnosed with significantly elevated copper levels. No source of copper was identified. Twenty-two trumpeter swans and 4 tundra swans were found dead in March 1985 at Harriman State Park. The die-off was not detected until several weeks after it occurred. Poor postmortem condition of the carcasses made diagnostic evaluation difficult. No single cause for the mortality event was determined. The following diseases have been identified in Idaho trumpeter swan populations.

Parasitism

Low level parasitism may not have much impact on overall health. Heavy parasite loads or parasites in conjunction with other stressors such as poor nutrition, severe weather, or disease can be a significant factor in survival. Multiple types of parasites including tapeworms, coccidian, nasal leeches, *Sarconema* (heartworms) and lice were detected in swans submitted to NWHC. In one bird, tapeworm infection resulted in intestinal blockage. In another, parasites were thought to be the precipitating factor in development of necrotic esophagitis, esophageal impaction, and emaciation. *Sarconema* sp. was documented in 2 cases as causing myocarditis (inflammation of the heart muscle). It was also found in conjunction with lead poisoning and emaciation. Nasal leeches were documented in 7 birds, including one with over 90 leeches present. Infected trumpeter swans could transfer internal and external parasites to the release sites. Physical examination for external parasites and analysis of blood smears and feces or cloacal swabs will help detect the presence of these organisms.

Emaciation

Emaciation is a wasting condition that occurs relatively slowly. The body's reserves are utilized for daily energy requirements which results in a lack of body fat and atrophy of muscles and internal organs. Emaciation was observed in 16 birds. It can be caused by starvation due to lack of food or inadequate diet. It also occurs as a result of chronic disease situations such as lead poisoning, myocarditis, and heavy parasite infestation. Evaluation of the type and availability of food resources at the release sites will help determine if nutritional needs can be met.

Lead Poisoning

Lead poisoning is caused by the ingestion of lead such as shot pellets, sinkers, or contaminated sediments. The lead is ground down in the gizzard and absorbed into the bloodstream as lead salt. Lead acts on multiple body systems resulting in a paralysis, emaciation, and death. Blood levels greater than .5 ppm or liver lead levels over 8 ppm (wet weight) are indicative of lead poisoning or elevated lead levels. Lead sinkers were found in the gizzards of some of the birds. Although steel shot is now used for hunting over wetlands, lead shot that was deposited in the environment years ago may still be available depending on the sediment characteristics of the area. Knowledge of historical uses of the release sites will help determine the need for environmental analysis of lead shot densities.

Trauma/Gunshot

Trauma due to gunshot, collision with a power line, or unidentified sources was detected in 9 of the 61 birds. Hunter education in the identification of trumpeter swans may help to minimize shooting deaths.

Other

Avian Cholera

Avian cholera is an acute contagious disease caused by the bacteria *Pasteurella multocida*. At necropsy, waterfowl often have yellow mucus filled intestines, hemorrhages on the heart, and white spots on the liver. The infection is spread through inhalation of aerosolized organisms, ingestion of food or water contaminated with infected feces, or direct contact with infected birds. None of the trumpeter swans submitted from Idaho were diagnosed as dying from avian cholera. *Pasteurella multocida* was isolated from one unusual case of endocarditis and pericarditis in a trumpeter swan. Although avian cholera has not been detected as a cause of death in swans from Idaho necropsied at NWHC, it has been documented in waterfowl in Idaho. The bacteria can be easily transmitted, therefore, swans could be exposed if utilizing areas of an ongoing outbreak.

Avian Pox

Avian pox is caused by avipoxvirus. The organism enters the body through abraded skin resulting in a cutaneous or a wet form of pox. In cutaneous pox, crusty wart-like growths form on featherless areas of the body. Wet pox is less common and is characterized by diphtheritic lesions on the mucus membranes lining the mouth, esophagus, or upper respiratory tract. Avian pox is spread through direct contact with affected birds, viral contaminated surfaces, mechanical vectors such as mosquitoes, and aerosols. Whether the disease is debilitating depends on the size and location of the lesions. Pox is rarely seen in wild waterfowl; however, outbreaks of avian pox have occurred in reintroduced trumpeter swans in Wisconsin.

Disease Risks at Release Sites

Consideration must be given to the diseases the translocated swans may be exposed to at the release site. Historical records of specimens submitted from release areas provide information on the diseases that have occurred at that site. Sampling a subpopulation of the animals at the proposed release site can also give an indication of what the translocated animals may encounter. Evaluation can then be made on the risk of those diseases to trumpeter swans.

Utah

NWHC records show that numerous cases of botulism have occurred from June to mid-October at Bear River National Wildlife Refuge (NWR). Botulism and avian cholera outbreaks have also occurred on the Great Salt Lake. Unlike botulism, avian cholera outbreaks commonly occur during the winter when swans could be present. In February 1982, 150 emaciated shovelers were found dead on the south shore of the Great Salt Lake, near a copper smelter. Copper toxicosis was suspected as the cause of death based on history, gross, and microscopic lesions. As previously mentioned, trumpeter swans are susceptible to copper poisoning. If swans might utilize areas where copper toxicosis is a possibility, preventive measures should be included in the disease contingency plan.

San Joaquin Delta

The NWHC's epizootic database was searched for die-off events in and around San Joaquin River NWR and Kesterson, Merced, San Luis, and Grasslands NWRs. Thirty-eight avian cholera outbreaks have been reported since 1975. Total mortality was estimated at over 35,000 birds. Five botulism outbreaks occurred during the same period with an estimated mortality of 76,000 birds. Most of the botulism outbreaks extended from May or June to October; however, one outbreak continued to early December.

Three die-offs due to selenium toxicosis or suspect toxicosis in waterfowl and other species were reported at Kesterson NWR. High selenium levels may be found in food items or contaminated water. Toxic levels have been associated with reproductive problems and death in waterfowl. If swans might utilize areas where selenium toxicosis

is a possibility, preventive measures should be included in the disease contingency plan.

Other Disease Concerns

Histomoniasis

Health risks to translocated populations cannot always be predicted. Sometimes new or unexpected diseases will appear in a population. One example of this was the histomoniasis outbreak that occurred in trumpeter swans translocated to Fish Springs NWR. As you are aware, during the winter of 1991-1992, 14 of the 36 translocated swans present at the Refuge were found sick or dead and another 14 were missing and presumed dead. Through laboratory tests and field investigation conducted by NWHC, the mortality was determined to be due to a Histomonas-like parasite infection, possibly *Histomonas meleagridis*.

The parasite was also found in 8 trumpeter swans euthanized just prior to migration. Histomoniasis is caused by a protozoan parasite that is best known for causing serious problems in domestic and wild gallinaceous birds. It has also been found on occasion in Canada geese. *Histomonas meleagridis* has a complex life cycle that involves cecal worms (*Heterakis gallinarum*) as a vector and earthworms as a transport host. There was no known exposure of the trumpeters to gallinaceous birds or to the parasite's vector or hosts. No other waterfowl (including 60 tundra swans) present at Fish Springs NWR were affected by the parasite. Mortality did not occur in trumpeters at the original capture site or any other translocation sites. The exact source of the parasite was not determined. Because trumpeter swans have been found to be susceptible to this parasite, it should be taken into consideration when selecting a release site. Historical knowledge of gallinaceous bird use in the release area would help determine the need for monitoring of those populations for histomoniasis infestation.

Health Monitoring Program

Health monitoring programs utilize laboratory tests and necropsy information to provide long-term evaluation of the disease status of a population. It is based on the idea that all the animals in a given population have generally been exposed to the same organisms. Therefore, monitoring health parameters of subgroups of that population over time can give a fairly good idea of the overall health history of the group. Health certification, on the other hand, is generally based on results of one set of samples and involves testing every animal prior to being moved. Some diseases may be overlooked suing that method if the animal is infected but not shedding the organism at that time. Additional problems arise when it is not practical to hold animals for the days or weeks it may take to receive laboratory results prior to shipping. Although it may save time to translocate the animals before the results are back, it does no good to have collected the samples because it is too late to take any corrective measures. Ideally, a statistically significant subset of swans in the original and translocated populations would be sampled during the year in an ongoing effort to monitor population health. Constraints associated with individual programs will help determine the intensity and feasibility of routine

monitoring activities.

Suggested Health Monitoring Actions to Include in the Idaho, Utah, and California Trumpeter Swan Translocation Project

Idaho

Monitor health status of the source flock(s) through collecting the following samples:

> Blood samples – Complete blood cell counts and serum chemistry analysis provide information on general health. Monitor blood lead levels and examine samples for *Sarcoma* sp. parasites.
>
> Fecal samples – Screen for intestinal parasites including tapeworms and coccidia.
>
> Physical exam – Examine for nasal leeches, external parasites, avian pox, and general body condition.

Monitor trumpeter swans and areas utilized by the swans for waterfowl mortality events. Continue to promptly submit swan and waterfowl carcasses to a diagnostic laboratory. Diagnostic findings can be used to evaluate the disease risk to trumpeter swans and determine disease control activities. Prior to translocation, contact the Department of Agriculture in the release states to determine if there are any diseases of particular concern to domestic birds in the state.

Utah and California

Monitor survival of translocated swans. Promptly submit dead swans to a diagnostic laboratory for evaluation. Monitor areas utilized by the swans for waterfowl mortality events. Obtain carcasses from die-offs for diagnostic testing. Based on the diagnosis, evaluate the disease risk to swans and implement preventive measures as necessary. If feasible, monitor the health of the translocated birds by routinely collecting blood and fecal samples.

Summary

Health implications should be considered in all aspects of translocation projects including disease risks at sites of origin and release, handling and transit activities, bio-security, and contact by personnel with pet birds or poultry. A health monitoring program cannot guarantee a successful translocation effort. Sometimes unexpected disease events may occur such as the histomoniasis outbreak at Fish Springs NWR. A monitoring program can help improve the odds for success by identifying possibly detrimental disease risks. Diseases that have been documented in Idaho trumpeter swans submitted to the NWHC include internal and external parasites, emaciation, lead poisoning, and trauma. Parasites could be transported to the release sites by infected birds. Emaciation can be caused by starvation or occur in conjunction with chronic disease situations. High lead levels in the body can impair normal body function. These

and other conditions affecting the general health, when combined with the stress of translocation, could affect individual survival. Physical examination and evaluation of blood and fecal samples will help determine the current health status of the source population.

Consideration should be given to diseases that the translocated birds might be exposed to at the release sites. Waterfowl die-offs due to avian botulism and avian cholera pose the greatest risk to translocated swans, both in Utah and California. Botulism generally occurs from lat spring to mid-fall, but can extend into winter months under some conditions. Avian cholera on the other hand, usually occurs during the winter. Monitoring waterfowl populations in and around the release site will help in the early detection of disease outbreaks. If swans might utilize areas with high copper or selenium levels, actions should be considered to minimize exposure. Routine physical examination and evaluation of blood and fecal samples from a subset of the population will help provide long-term data on the health status of the relocated birds. Input from field personnel involved in trumpeter swan restoration efforts will be needed to determine the feasibility and logistics of site-specific health monitoring activities.

APPENDIX 8: Summary of Major Changes Made in the 1998 Plan From the 1992 Revision.

1. This revision recognized that:

    a. There was a significant southerly shift in winter distribution of the RMP during the winters of 1996-1997 and 1997-1998, suggesting that a decade of intensive trapping, translocations, and hazing has been effective in reducing the number of swans wintering in the Harriman State Park area of eastern Idaho.

    b. Termination of supplemental winter feeding at Red Rock Lakes National Wildlife Refuge, Montana, and trapping at Harriman State Park reduced the size of flocks that summer in the core Tri-state Area of southeast Idaho, southwest Montana, and northwest Wyoming.

    c. Supplemental feeding, of any kind and at any time and location, is counter to the goal and objectives of this plan.

    d. Past range expansion efforts have resulted in the establishment of several new breeding sites in the U.S.

    e. There is uncertainty regarding where swans will choose to winter after they are forced out of Harriman State Park, Idaho.

    f. Monitoring of the RMP and marked individuals is a high priority. The ability to monitor the entire RMP and assess progress toward achieving the goal and objectives of this plan are being hampered on (1) wintering areas because the population is dispersing to new sites scattered across an ever-increasing geographic area, including most western states, and mixing with other waterfowl, and (2) on production areas in Canada because Canadian agencies have lost funding for surveys.

2. The 1992 plan goal to Restore the RMP as a secure and primarily migratory population, sustained by naturally-occurring food sources in diverse breeding and wintering sites was changed to "Restore the RMP as a secure and primarily migratory population, with a 5% average annual growth in number of wintering birds, sustained by naturally-occurring and agricultural food resources in diverse breeding and wintering sites".

3. Management objectives were increased from two (develop a winter population of at least 2,200 distributed within the natural carrying capacity of the Tri-state Area; develop a dispersed breeding population of at least 355 nesting pairs in the U.S. and Canada) to five (redistribute wintering swans to wintering areas outside of the core Tri-state Area, reduce the number of wintering swans in the core Tri-state Area to a maximum of 1,500; rebuild U.S. breeding flocks by year 2002 to at least 131 nesting pairs (594 adults and subadults); encourage growth of Canadian flocks; increase the abundance of most desirable aquatic

plants in the Henry's Fork of the Snake River in and near Harriman State Park; and monitor the population).

4. The emphasis on translocations has been changed from trapping and moving winter-trapped swans to primarily trapping and moving flightless U.S. and Canadian cygnets.

5. Emphasis was placed on the need to haze swans from Harriman State Park to maintain approximately 200 swans but discourage duck and goose use.

6. The trapping of swans in Harriman State Park and their translocation to other sites will be considered only when the number wintering in the Park is above 300; the results are expected to further RMP range expansion efforts; the translocations are approved by the Pacific Flyway Study Committee; and swans are not translocated outside Idaho or to the Preston, Idaho, site through the winter of 1999-2000.

7. A strategy has been added to maintain trumpeter-swan-compatible, tundra swan sport hunting opportunities in the Pacific Flyway.

8. An objective has been added under public education to provide cooperating agencies, concerned nongovernmental organizations, and the general public with up-to-date, clear, and accurate information on management activities, problems, and accomplishments in a timely and professional manner.

9. Research needs have been updated.

APPENDIX 9: Summary of Major Changes in 2008 Revision from the 1998 Revision

1. This revision combines the Trumpeter Swan Implementation Plan approved by the Pacific Flyway Council in 2002 and the 1998 Revision into one plan. This has resulted in somewhat more detail and more specific reporting requirements.

2. Management Objectives were increased from 5 to 6 by adding an objective concerning management of a tundra swan hunt that is compatible with trumpeter swan conservation. This was a strategy in the 1998 plan.

3. The objectives and tasks concerning Canadian breeding range underwent significant revision.

4. Numerical objectives for Alberta breeding pairs were added consistent with the Alberta recovery objectives.

5. An objective was added for Research and Information Needs.

6. Translocations have been de-emphasized and are utilizing captive-raised swans for establishing new nesting groups.

7. More emphasis is placed on habitat assessment throughout the annual cycle.

8. Special sections were added for Yellowstone National Park and Grand Teton National Park.

APPENDIX 10: History of RMP Population Objectives in North American and Pacific Flyway Trumpeter Swan Management Plans.

	Nesting pairs[a]				
Location	**1984**	**1992**	**1998**	**2001 (TSIP)**	**2008**
Montana					
Centennial Valley	**38**	**38**	**12**	**33**	**19**
Madison, Paradise			**1**	**5**	**15**
Blackfoot, East Front				**7**	**10**
Flathead Drainage				**10**	**15**
Total	**43**	**43**	**13**	**55**	**59**
Wyoming					
Yellowstone National Park	**20**	**15**	**5**	**10**	**10**
Snake River Core			**13**	**18**	**18**
Green River					**16**
Salt River					**2**
Total	**30**	**45**	**18**	**28**	**46**
Idaho					
Island Park			**6**	**>10**	**10**
Henry's Fork Drainage					**6**
Teton Basin					**2**
Fort Hall Bottoms					**3**
Bear Lake NWR					**5**
Grays Lake NWR					**10**
Camas County					**1**
Total	**25**	**25**	**25**	**>35**	**37**
Oregon					
Malheur NWR/Harney County					**5**
Central Oregon					**10**
Total	[b]	**25**	**8**	**25**	**15**
Nevada					
Ruby Lake NWR	**8**				
Total	[b]	**7**	**4**	**5**	**8**
U.S. Total	**98**[b]	**145**	**68**	**131**	**165**
Alberta					
Elk Island					**10**
Total					**98**
Canada Total	**85**	**210**			
Grand Total	**143**	**355**	**68**	**131**	**263**

[a] The criterion nesting pair is defined as a swan pair that is displaying evidence of nesting (e.g., nest building, incubation, brooding posture, visible eggs); it may require on-the-ground verification. It provides more accurate information on reproductive activity than does breeding pairs, but it may not always be available because of the need for verification.

[b] Malheur NWR and Ruby Lake NWR swans were not included in the RMP in 1984.

Appendix 10. Continued.

Location	Adults and subadults[a]				
	1984[b]	1992[b]	1998	2001 (TSIP)	2008
Montana					
Centennial Valley			90	160	140
Madison, Paradise			5	10	65
Blackfoot, East Front					25
Flathead Drainage					20
Total			95	170	250
Wyoming					
Yellowstone National Park			18	40	40
Snake River Core			89		60
Green River					53
Salt River					7
Total			107	160	160
Idaho					
Island Park					60
Henry's Fork Drainage					30
Teton Basin					10
Fort Hall Bottoms					15
Bear Lake NWR					25
Grays Lake NWR					30
Camas County					5
Total			118	150	175
Oregon					
Malheur NWR/Harney County					25
Central Oregon					50
Total			32	100	75
Nevada					
Ruby Lake NWR					18
Total			12	14	18
Grand Total				594	718

[a] White birds only, counted during the Fall Survey of the RMP/U.S. Breeding Segment.
[b] No Adult and Subadult objectives in the 1984 or 1992 RMP plans.

APPENDIX 11: Release Protocol for the Rocky Mountain Population of Trumpeter Swans.

Council Approved Projects and Release Sites: Trumpeter swans may only be released as part of projects and at sites that have received prior approval by the Pacific Flyway Council. The following sites had Council approval as of March, 2009: Flathead Indian Reservation, MT; Blackfoot River Valley, MT; Fort Hall Indian Reservation, ID; Summer Lake Wildlife Management Area, OR; Bear Lake, ID; and Lower Green River, WY.

Priority of Current Projects: Established, approved projects will receive priority for releases until project objectives are met. Resources will not be diverted to new sites if doing so might jeopardize or unnecessarily prolong ongoing projects. The sooner the nesting-pair objectives of a project are met, the sooner additional birds can be made available for new, approved projects. The Pacific Flyway Council will establish the priority order of projects in March 2009, based on recommendations of the Study Committee and input from the Greater Yellowstone Trumpeter Swan Working Group (GYTSWG). The criteria the Study Committee will use to prioritize approved sites will consist of: (1) whether the site is within the tri-state area, which would enhance connectively with existing nesting aggregations, (2) consideration of when the project was implemented, (3) whether swans from the site are likely to winter outside of the core tri-state area, and (4) the commitment to monitoring and assessment of project progress.

Establishment of New Projects and Release Sites: Approval of new release sites should be contingent on completion of habitat assessment indicating sufficient habitat in quality and quantity are present to indicate a high probability of project success and, thus, a meaningful contribution to achievement of one or more Objectives of the RMP Plan. The RMP Trumpeter Swan Subcommittee should adopt by March 2010 minimum criteria that must be met for such assessments, using tools and models currently available (e.g., the Expert System developed by USGS; Blackfoot Challenge habitat assessment, Wyoming assessment procedures by Patla and Lockman). Further, new projects will not be approved without an acceptable monitoring plan to evaluate project progress, success, or failure. As with habitat assessments, the Subcommittee will develop criteria for monitoring plans, which should include means to determine wintering locations of released swans. These assessments can be completed at any time and will be put in a prioritized project queue for future releases once ongoing projects are completed. Annually, a representative from each project receiving swans from the Wyoming Wetlands Society will prepare a report detailing progress toward project objectives. This report will be delivered to the GYTSWG prior to their annual fall meeting, so that members can review progress and develop recommendations for submission to the Pacific Flyway Study Committee.

Annual Process for Requesting and Allocating Swans for Release: The RMP Trumpeter Swan Subcommittee will establish a swan-release subcommittee during their March 2009 meeting to annually prioritize releases based on available stock.

Annually at the March RMP Trumpeter Swan Subcommittee meeting, a representative of each approved project will have submitted how many swans they would like to release in the

upcoming year to the Subcommittee Chair. If they expect to have birds available from sources other than stock designated as for Pacific Flyway releases from the Wyoming Wetlands Society, the number expected from other sources will also be specific and tested to assure genetic compatibility with the RMP.

Also at the March meeting, the Wyoming Wetlands Society will specify the number of birds expected to be available for the Pacific Flyway releases. If sufficient stock is expected to meet the requests of the approved projects, the numbers requested will receive tentative approval. If it is projected that sufficient stock will not be available, the release committee will determine the tentative numbers to be released. More birds will be allocated to higher priority projects. The Wyoming Wetlands Society will inform the Subcommittee on the expected cost per bird, if any, to the project receiving them.

The RMP Trumpeter Swan Subcommittee will draft a recommendation containing the specifics for releases during the subsequent spring for Council review and approval. Annually, the allocation of swans to areas outside the tri-state area will be constrained to no more than 20% of the total number of birds available for release. After the nesting season, when the number of swans available for release can be determined more precisely, the release committee can adjust the numbers approved for each site as appropriate consistent with the Council-approved recommendation.

The swan-release subcommittee will consider developing a weighted formula for determining swan allocations for release if there are insufficient birds to meet requests. The formula or other process will allocate proportionally more birds according to project priority and/or success of individual project efforts to date.

Periodically, but not more frequently than once every five years, the Council may reassess the progress and priorities of all approved projects. To ensure that projects have a legitimate chance for success, it is not appropriate to change priorities annually unless results indicate there is little likelihood one or more ongoing projects will successful.