PACIFIC FLYWAY COUNCIL

Management Plan: Rocky Mountain Population of Trumpeter Swans

Adopted August 2017

Cover photograph: Trumpeter swan, © 2014 Richard Sonnen, courtesy of The Trumpeter Swan Society.

This management plan is one of a series of cooperatively developed plans for managing various populations of migratory birds in the Pacific Flyway. Inquiries about this plan may be directed to member states of the Pacific Flyway Council or to the Pacific Flyway Representative, U.S. Fish and Wildlife Service, Division of Migratory Bird Management, 1211 SE Cardinal Court, Suite 100, Vancouver, WA 98683-9684. Information regarding the Pacific Flyway Council and management plans can be found on the Internet at PacificFlyway.gov.

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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
Direccion General de Conservacion Ecologica de Recursos Naturales

by the

Rocky Mountain Population Trumpeter Swan Subcommittee
of the
Pacific Flyway Study Committee

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Chairperson, Pacific Flyway Council — Date

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PREFACE

The Pacific Flyway Council (Council) is an administrative body that forges cooperation among public wildlife agencies for the purpose of protecting and conserving migratory birds in western North America. The Council is composed of an appointee from the public wildlife agency in each state, province and territory in the western United States, Canada, and Mexico. Migratory birds use four major migratory routes (Pacific, Central, Mississippi, and Atlantic flyways) in North America. Because of the unique biological characteristics and relative number of hunters in these regions, state and federal wildlife agencies adopted the flyway structure for administering migratory bird resources within the United States. Each flyway has its own Council.

Flyway management plans are developed by Council technical committees that consist of biologists from state, federal, and provincial wildlife and land-management agencies, universities, and others. Management plans typically focus on populations, which are the primary unit of management, but may be specific to species or subspecies. Management plans identify issues, goals, and actions for the cooperative management of migratory birds among State and Federal agencies to protect and conserve these birds in North America. Management of some migratory birds requires coordinated action by more than one flyway. Plans identify common goals and objectives, prioritize management actions and assign responsibility for them, coordinate collection and analysis of biological data, foster collaborative efforts across geo-political boundaries, document agreements on harvest strategies, and emphasize research needed to improve conservation and management. Population sustainability is the first consideration, followed by equitable recreational and subsistence harvest opportunities. Management plans generally have a 5-year planning horizon, with revisions as necessary to provide current guidance on coordinated management. Management strategies are recommendations and do not commit agencies to specific actions or schedules. Fiscal, legislative, and priority constraints influence the level and timing of management activities.

Management plans are not intended as an exhaustive compendium of information available, research needed, and management actions. Plans include summaries of historical data and information from recent surveys and research that help identify: (1) the current state of the resource (i.e., population and associated habitats), (2) desired future condition of the resource (i.e., population goals and objectives), (3) immediate management issues managers face, and (4) management actions necessary and assignment of responsibilities to achieve the desired future condition, including harvest strategies and monitoring to evaluate population status and management progress.

This plan provides guidelines for management of the Rocky Mountain Population (RMP) of trumpeter swans (*Cygnus buccinator*). The first Pacific Flyway management plan for this species was included as part of The North American Management Plan for trumpeter swans approved by Council in 1984 (USFWS 1984). The RMP information in that plan became the basis for a stand-alone Pacific Flyway RMP Management Plan approved in 1992. Revisions occurred in 1998, 2008, and 2012. In addition, in 2002 a Pacific Flyway Trumpeter Swan Implementation Plan (TSIP) was completed and approved by 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, and contained updated objectives, strategies and tasks for the five-year period 2002–2007. The 2008 revision combined the TSIP and the 1998 revision into one plan. In this 2017 plan, RMP geographic references were revised to correct problems with inconsistencies in use, particularly, past use of the term “Tri-state” and to incorporate the term “Greater Yellowstone,” which has gained broad public and resource agency usage in recent years. Consistent reference of geographic areas will aid in data continuity among years.

ACRONYMS USED

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BLNWR	Bears Lake National Wildlife Refuge
BTNF	Bridger-Teton National Forest
CWS	Canadian Wildlife Service
CNWR	Camas National Wildlife Refuge
CSKT	Confederated Salish and Kootenai Tribes
CTNF	Caribou-Teton National Forest
DMBM	Division of Migratory Bird Management, USFWS
DMBO	Division of Migratory Bird Office, USFWS
GLNWR	Gray's Lakes National Wildlife Refuge
GTNP	Grand Teton National Park
GYTSWG	Greater Yellowstone Trumpeter Swan Working Group
HSP	Harriman State Park
IDFG	Idaho Department of Fish and Game
IP	Interior Population
MFWP	Montana Fish, Wildlife, and Parks
MBSP	Migratory Birds and State Programs , USFWS
NDOW	Nevada Division of Wildlife
NER	National Elk Refuge
NWR	National Wildlife Refuge
NRTSS	Northern Rockies Trumpeter Swan Stewards

ODFW	Oregon Department of Fish and Wildlife
PCP	Pacific Coast Population
PFC	Pacific Flyway Council
PFSC	Pacific Flyway Study Committee
RMP	Rocky Mountain Population of Trumpeter Swans
RRLNWR	Red Rock Lakes National Wildlife Refuge
SNWR	Seedskadee National Wildlife Refuge
TNC	The Nature Conservancy
TNWR	Turnbull National Wildlife Refuge
TTSS	The Trumpeter Swan Society
TSIP	Trumpeter Swan Implementation Plan
UDWR	Utah Division of Wildlife Resources
USGS	U.S. Geological Survey
USGS-BRD	U.S.G.S. Biological Resource Division
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USNPS	U.S. National Park Service
WDFW	Washington Department of Fish and Wildlife
WGFD	Wyoming Game and Fish Department
WMA	Wildlife Management Area
WWS	Wyoming Wetlands Society
YNP	Yellowstone National Park

MANAGEMENT PLAN
FOR THE
ROCKY MOUNTAIN POPULATION OF TRUMPETER SWANS

INTRODUCTION

To facilitate monitoring and management, the U.S. Fish and Wildlife Service (FWS) and Canadian Wildlife Service (CWS) designated three management populations of trumpeter swans (*Cygnus buccinator*) in North America: the Pacific Coast (PCP), the Rocky Mountain (RMP), and the Interior (IP) (Figure 1). These populations are addressed in separate management plans. This plan provides guidelines for the management of RMP trumpeter swans only.

The Rocky Mountain Population of trumpeter swans consists of birds nesting primarily from Western Canada southwards to Nevada and Wyoming (Figure 1). It is comprised of two primary breeding segments; the RMP U.S. breeding segment (Figures 2 and 3) and the migratory RMP Canadian breeding segment.

The RMP U.S. breeding segment is comprised of Greater Yellowstone flocks and restoration flocks. Greater Yellowstone flocks summer in Yellowstone National Park and the portions of Idaho, Montana, and Wyoming within the Greater Yellowstone area (Figure 2). Most swans remain within this area in winter, where they intermingle with the much larger numbers of migrant trumpeter swans from Canada.

Restoration flocks refer to groups of swans established outside of the Greater Yellowstone area, which includes those flocks at Ruby Lake NWR, Nevada; Malheur NWR and Summer Lake WA, Oregon; Turnbull NWR, Washington; and the Flathead and Blackfoot valleys of western Montana (Figure 2). While some restoration flocks primarily winter near their breeding areas, others disperse widely. Documented migrations to wintering sites in Greater Yellowstone have been infrequent.

The primarily migratory RMP Canadian breeding segment summers in southeastern Yukon Territory, southwestern Northwest Territories, northeastern British Columbia, and Alberta. Nesting birds in western Saskatchewan were extirpated in 1995. Greater Yellowstone is their only known major wintering area, although evidence of dispersal to other scattered wintering areas has increased in recent years.

The following additional geographic terms are used throughout this document and in data analysis or management discussions:

Tri-state region refers to the entire state of Idaho, and portions of Montana and Wyoming within the Pacific Flyway (Figure 2).

Greater Yellowstone core area represents that portion of the Greater Yellowstone area within which almost all trumpeter swans in Idaho, Montana, and Wyoming summered and wintered during much of the 20th century, prior to the range expansion efforts that began in the late 1930s

but became more extensive in the 1980s (Cornely et al. 1985. Shea et al. 1993, Shea and Drewein 1999. Shea et. al 2013). It includes the entire Island Park region, Teton River drainage, Teton Basin, Henrys and South Forks of the Snake River south to Idaho Falls, and Camas NWR/Mud Lake area of Idaho; Red Rock Lakes NWR, Centennial Valley, Hebgen Lake, and upper Madison River drainage 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 (Figures 2 and 3).

Greater Yellowstone expansion area describes the remainder of the Greater Yellowstone area outside of the Greater Yellowstone core area. See inset for a summary of RMP flocks, population segments, and geographic reference areas.

Overall, RMP trumpeter swans have recovered from the brink of extinction since the early 1900s and the population is doing extremely well (Appendix A; Groves 2017). However, there remain concerns for trumpeter swans that nest and reside year-round in the U.S. portion of the Pacific Flyway especially in the Greater Yellowstone area. The states of Idaho, Montana and Wyoming have designated the trumpeter swan a species of conservation concern and have state trust responsibilities to continue recovery efforts for this species. Also, trumpeter swans now play a key role in stimulating support and funding for wetland conservation and habitat management efforts that benefit a number of other wildlife species, and there are great benefits to continue to work towards increasing or maintaining their numbers in the U.S breeding segment.

RMP Trumpeter swan population segments, flocks, and geographic reference areas.

Population segments and flocks

Canadian breeding segment
- Alberta flock
- British Columbia flock
- Yukon flock
- Northwest Territories flock

U.S. breeding segment
- Greater Yellowstone flocks
  - Idaho Flock
  - Montana Flock
  - Wyoming Flock
- Restoration flocks
  - Flathead flock (MT)
  - Blackfoot flock (MT)
  - Malheur flock (OR)
  - Summer Lake flock (OR)
  - Turnbull flock (WA)
  - Ruby Lake flock (NV)

Geographic reference areas

Tri-State Region: Pacific Flyway portions of Montana, Wyoming, and Idaho

Greater Yellowstone core area: Area within which almost all Tri-state trumpeter swans summered and wintered during much of the 20th century prior to expansion efforts that began in the late 1980s

Greater Yellowstone expansion area: Portions of Greater Yellowstone outside of the core area where trumpeter swans have been recently established.

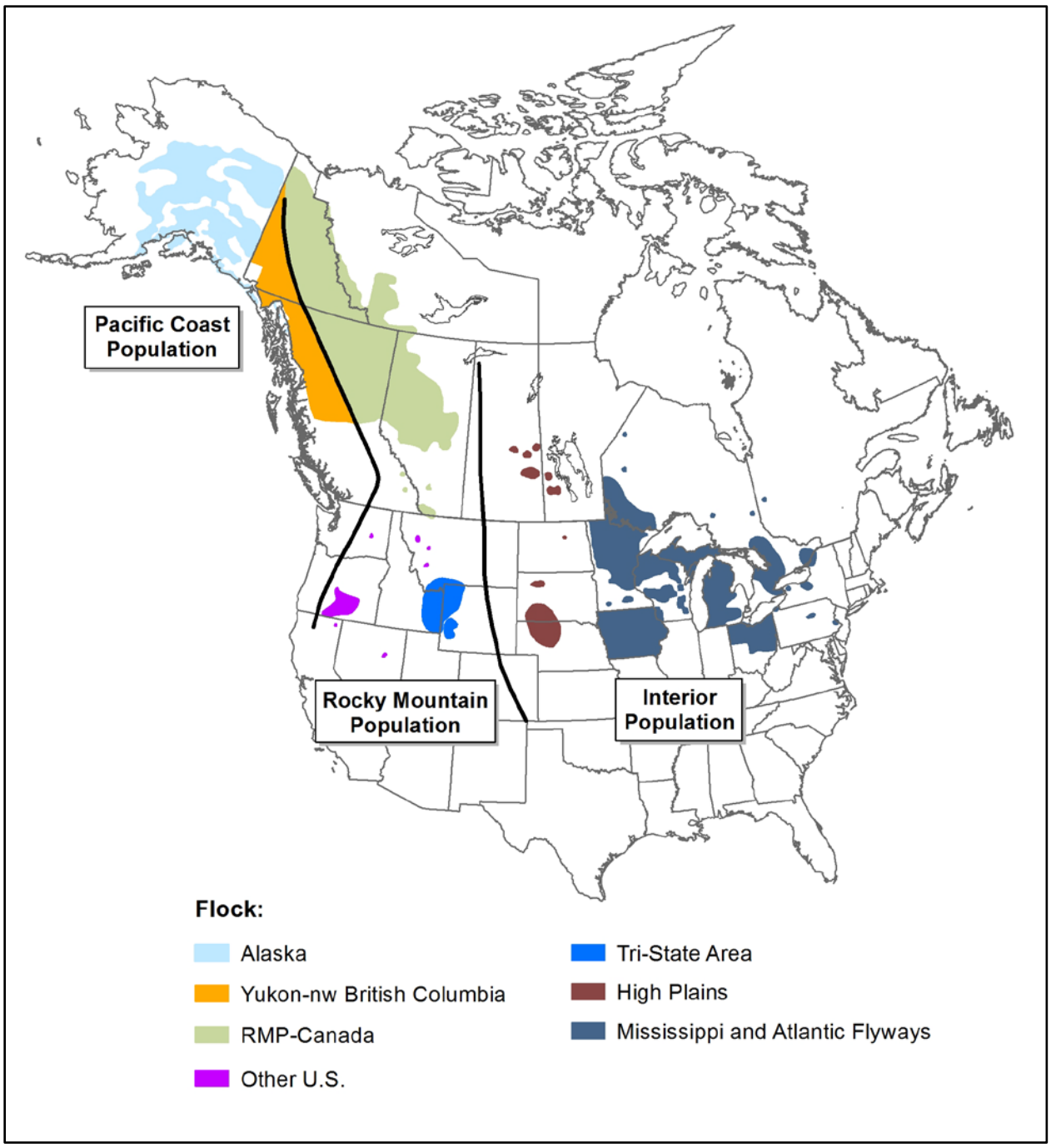

Figure 1. Approximate summer range of the Pacific Coast, Rocky Mountain, and Interior Populations of trumpeter swans, as reported by North American Trumpeter Swan Survey cooperators. The range in British Columbia was delineated using data from the 2015 survey and the British Columbia Bird atlas (2015). Map from Groves 2017.

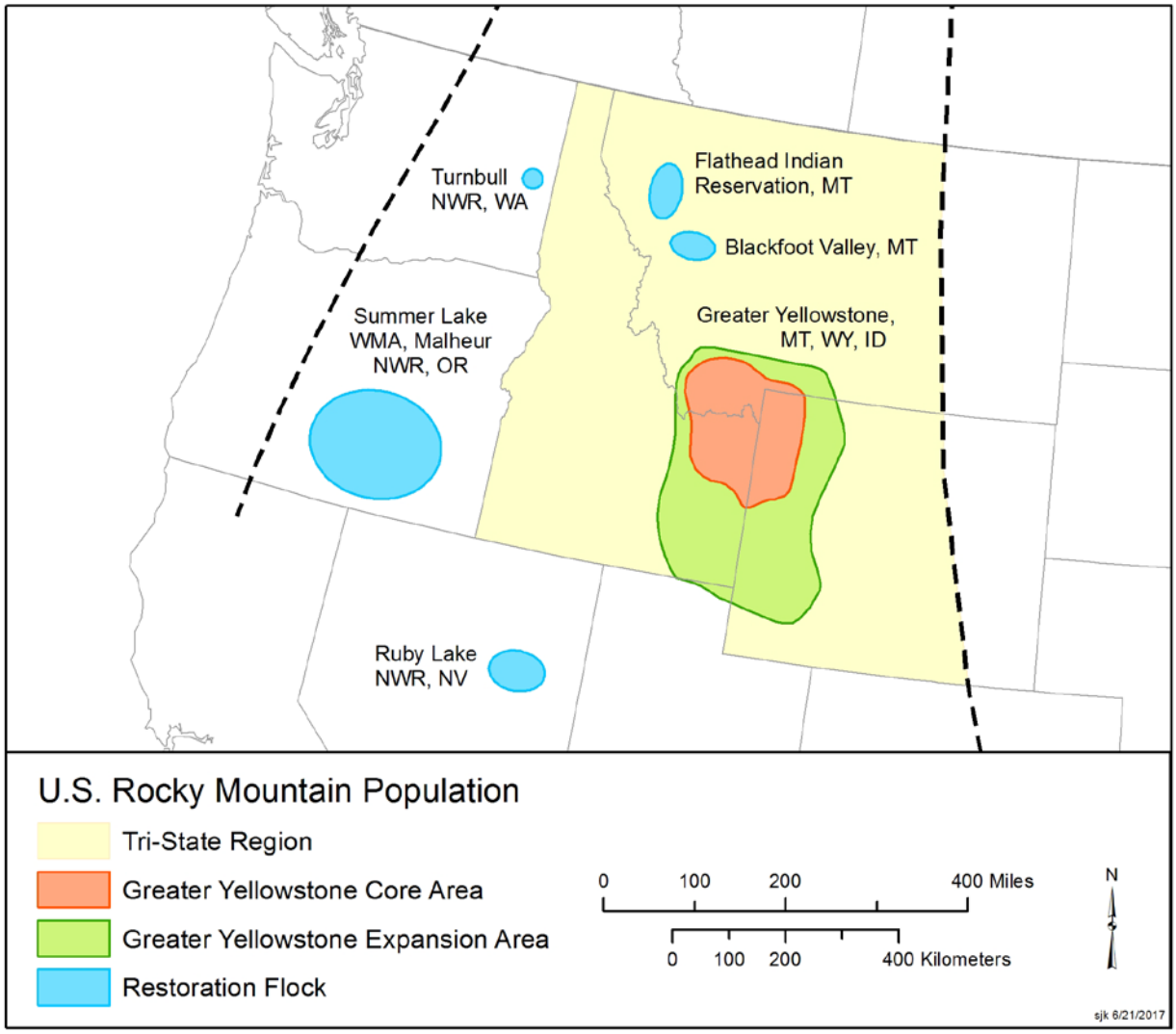

Figure 2. Rocky Mountain Population U.S. breeding segment. Map courtesy of Sonya Knetter IDFG 2017.

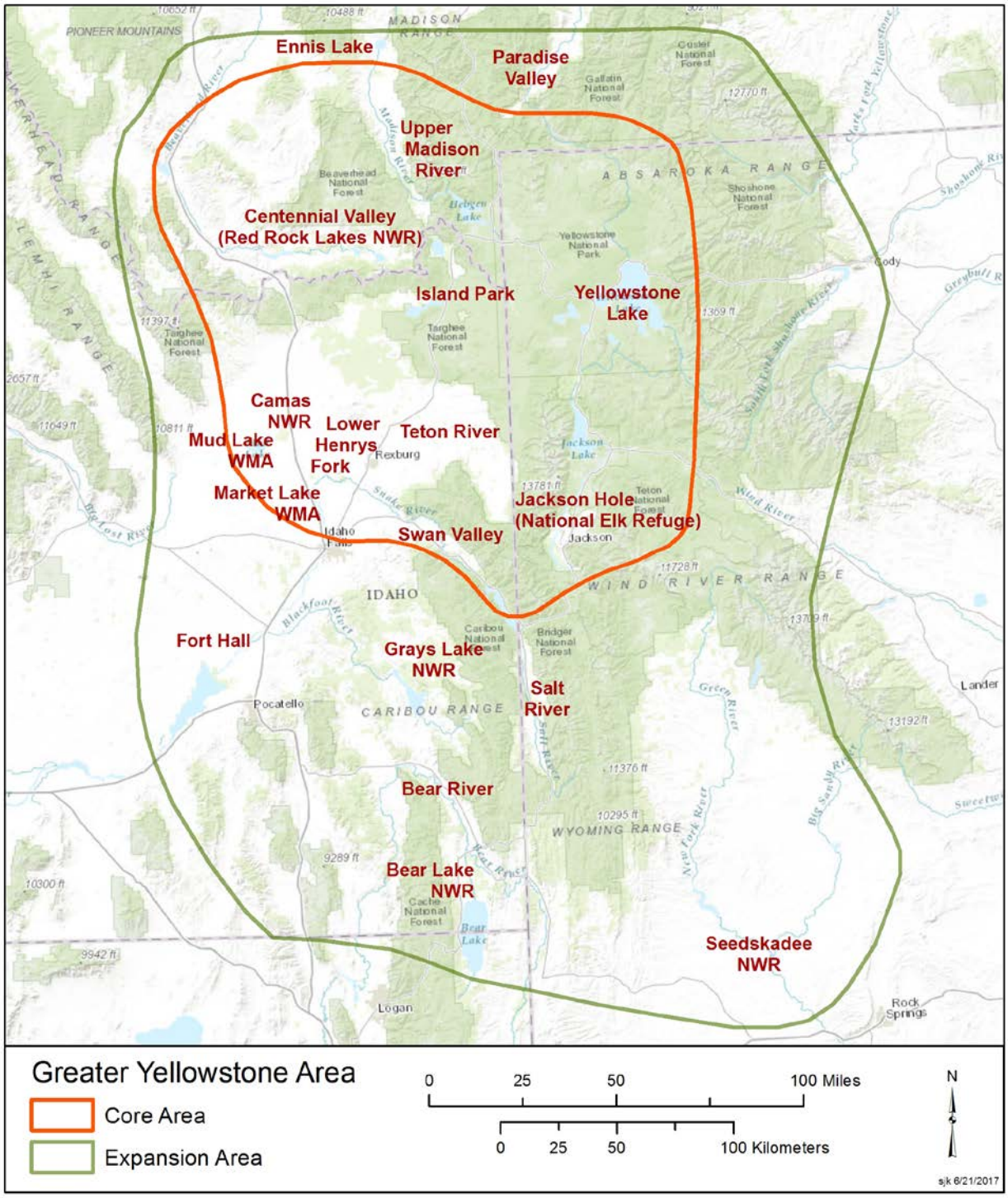

Figure 3. Greater Yellowstone area including both the core and expansion areas. Map courtesy of Sonya Knetter IDFG 2017.

GOAL

The goal is to maintain RMP trumpeter swans to ensure long-term conservation, meet needs for recreational uses, and minimize nuisance concerns.

OBJECTIVES

Population

1. Maintain a minimum RMP of 10,000 adults and subadult birds (white birds) using data from the North American Trumpeter Swan Survey.

2. Maintain an RMP U.S. breeding segment of at least 718 adult and subadult birds (white birds) using data from the September (Fall) Survey.

3. Encourage continued growth to restore an interconnected, self-sustaining breeding population that uses diverse habitats across the historic range of the species within the Pacific Flyway. Attain the desired distribution and numbers of white birds and nesting pairs with broods within the next 5 years (Table 1).

4. Maintain a self-sustaining RMP Canadian breeding segment (as monitored by the North American Trumpeter Swan Survey), well distributed throughout Western and Northern Canada.

Habitat

5. Maintain, and when possible, improve quantity and quality of breeding and wintering habitats to support population objectives throughout the annual cycle.

6. Identify potential restoration areas that will support breeding range expansion, enhance connectivity and growth of breeding flocks, and increase the likelihood swans will use new wintering habitats.

Harvest

7. Ensure trumpeter swan conservation is considered to maintain compatibility with tundra swan hunting in the Pacific Flyway.

Information Needs/Research

8. Seek funds to address priority research and information needs, as well as habitat improvement and range expansion efforts

STATUS

Abundance and Trends

Trumpeter swans (*Cygnus buccinator*), endemic to North America, are the largest of all native North American waterfowl. Trumpeter swans are long-lived with strong family bonds and strong traditions of migration routes and habitat use that may be passed on for generations (Banko 1960, Mitchell 2010, Shea et al. 2013). Once widespread and abundant across much of the continent, trumpeter swan populations rapidly decreased as subsistence harvest, commercial swan-skin harvest, and wetland drainage expanded westward with early settlers and they neared extinction by 1900.

By 1900, the only surviving breeding group in the lower 48 states nested and wintered in the Greater Yellowstone core area in and near Yellowstone National Park. Protected by the region's remoteness, these birds wintered in isolated sites where geothermal runoff created small ice-free areas regardless of winter severity (Banko 1960). By 1933, this group included about 70 resident swans that were joined each winter by a similar number of migrant trumpeter swans from nesting areas in Canada. The species' diverse migrations to other inland and coastal wintering areas were destroyed as all other flocks, with the exception of a small remnant group in Alaska, were eliminated (Shea et al. 2013).

Trumpeter swans that persisted in Alaska have expanded in abundance and distribution since their discovery in the 1950s, and now comprise the Pacific Coast Population (PCP) which winters as far south as western Oregon. Although trumpeter swans were extirpated from eastern and central portions of North America, restoration efforts using PCP and RMP stock have created numerous flocks which now comprise the Interior Population (IP).

Concern about trumpeter swan status led to conservation efforts that included land acquisition, habitat conservation and management, supplemental winter feeding, protection from illegal shooting and closed hunting seasons, law enforcement, public education, and range expansion programs including translocation efforts, and release of captive-reared swans.

Due to these efforts, trumpeter swans have increased from a few remnant groups in the early 1900s to a continental estimate of 63,016 white birds (adults and sub adults; Appendix A) (Groves 2012, 2017). This range-wide survey, completed in late summer or fall, has been conducted at 5-year intervals since 1975 by the USFWS, CWS, cooperating states and provinces, and other partners (the initial survey was conducted in 1968). Methods are not necessarily consistent among years and regions; therefore, caution should be adopted when comparing 5-year survey results (D. Groves, USFWS, personal communication 2017); however, it is the official range-wide status assessment for trumpeter swans.

The RMP increased from less than 200 total swans in the early 1930s to an estimated 11,721 white birds in 2015 (Groves 2012, 2017). Of these, 10,957 (94%) were from the Canadian breeding segment, 548 (4%) from the Tristate/Greater Yellowstone area, and 216 (2%) from US restoration flocks.

Summer Status and Productivity
The RMP U.S. breeding segment is monitored annually through a coordinated USFWS/partners Fall Survey conducted in September and intended to provide an annual assessment of RMP U.S. breeding segment productivity as well as total abundance and distribution (USFWS 2016; Appendix B).

In the last decade, Canadian distribution has expanded northward and into areas of east-central Alberta, northeastern British Columbia, southeastern Yukon Territory, and southwestern Northwest Territories. In recognition of the desire to broaden the distribution of swans nesting in Greater Yellowstone and other U.S. locations, cooperative efforts are underway to establish nesting flocks in more areas. An important long-term objective of these efforts and this plan, is to increase connectivity among existing flocks to ensure long-term viability. Trumpeter swans are now nesting in areas of Idaho, Montana, Wyoming, Oregon, Washington, and Nevada (USFWS 2016).

As the RMP Canadian breeding segment has increased, the proportion of the Greater Yellowstone flock, to the entire population, has decreased, but they remain important to ensure long-term conservation of the U.S. breeding segment. This plan recognizes the biological importance of the Greater Yellowstone flocks which comprise nearly three quarters of all RMP trumpeter swans and nests in the western U.S. Because this is the sole surviving native breeding group of trumpeter swans in the lower 48 states, the general public, federal and state agencies, tribes and nongovernmental organizations have a very high interest in preserving them. Red Rocks Lakes NWR (RRLNWR) is the single most important nesting area for trumpeter swans in Greater Yellowstone area. Management strategies aim to maintain nesting trumpeter swans at RRLNWR and elsewhere in Greater Yellowstone where they can exist without winter feeding.

Fall Migration Routes
During fall migration (Oct-Nov), the primary route for the Canadian breeding segment runs south along the East Front of the Rocky Mountains to Greater Yellowstone where they use agricultural fields and ice-free waters (USFWS 2016). Several hundred birds continue into the southern portions of Greater Yellowstone and possibly further south. A limited number of swans are recorded each winter in northern Utah and northwestern Colorado, and a few hundred birds also migrate through western Idaho through Oregon's Summer Lake area and possibly continue into California.

Winter Status
Until 2015, the RMP trumpeter swans were also counted in midwinter (late January or early February) to determine population trends and calculate the proportion of Canadian breeding segment wintering in the Greater Yellowstone area and the proportion wintering elsewhere, because Canadian and Greater Yellowstone flocks winter sympatrically in Greater Yellowstone (USFWS 2015; Appendix C). RMP trumpeter swans have consistently increased over the last few decades, primarily due to the growth in the Canadian breeding segment. During the 2015 winter survey 6,933 total birds (5587 white birds and 1346 cygnets) were counted. The population increased at an annual rate of 11.4% per year from 2000 to 2015; however, the RMP U.S. breeding segment only increased 3.3% annually from 2000–2015 (USFWS 2015).

There is concern that continued growth of the Canadian breeding segment may have an adverse impact on the relatively sedentary Greater Yellowstone flocks. In recent mild winters, large numbers of wintering swans, particularly in Idaho, have shifted to field feeding. The ecological impact of this behavioral shift on potential competition between Greater Yellowstone and Canadian trumpeter swans is not understood.

It is not clear where swans choose to winter outside of the Greater Yellowstone core area. Although highly variable, the most suitable habitats to winter significant numbers of trumpeter swans include southern Idaho, northern Utah, northern Nevada, and California. This 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; Ryser 1985; Woodbury et al. 1949). Southern Idaho, northern Utah, and northern Nevada also appear to have significant amounts of spring and fall migration stop-over habitat.

Efforts to reduce the number of wintering swans at Harriman State Park (HSP) and RRLNWR in the early 1990s resulted in 1,477 RMP swans being translocated to sites in Oregon, southern Idaho, Utah, and southwestern Wyoming. These releases generally showed signs of swans using new wintering areas and migration routes that may divert swans away from the Greater Yellowstone core area. As the population has increased, so has their range, and trumpeter swans now winter in southeastern Idaho (America Falls Reservoir and part of the Fort Hall Indian Reservation), and smaller flocks are reported along the Snake River in southwest Idaho, in the Bear River valley at least as far south as the Utah border, and at Summer Lake WA in Oregon. 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. During the last midwinter survey (USFWS 2015), about 35% of the trumpeter swans wintering within Greater Yellowstone area were found within The Greater Yellowstone expansion area, which had been a goal of the range expansion efforts.

Spring Migration Routes

Spring migration is highly variable and may be driven by increasing day length and/or habitat conditions. Canadian trumpeter swans wintering in Greater Yellowstone generally leave between February-April, with large numbers staging at Ennis Lake in southwest Montana. Flocks head north along the eastern front of the Rocky Mountains (Mitchell. 2010). As they move north from Greater Yellowstone they move to lower elevation field feeding sites where spring meltwater and early green up provide excellent pre-breeding foraging sites (LaMontagne et. al 2011).

Harvest Management

Three states within the range of the RMP have regulated sport harvest of tundra swans (Utah, Nevada, and Montana), and each state independently manages their season to maintain and manage sport hunting of tundra swans in a manner compatible with trumpeter swan conservation (Pacific Flyway Council 1997, 2017). These 3 states are required to track trumpeter swan harvest annually and they each provide an estimate of trumpeter swan harvest at the Pacific Flyway RMP Trumpeter Swan Subcommittee meeting annually. Utah uses an identification test that potential tundra swan hunters are required to pass before they will be issued a swan permit. Within Utah and Nevada, all harvested swans must be inspected by a representative of the state

wildlife agency or other approved personnel. Montana requests all successful swan hunters fill out a mandatory bill card to determine the portion of trumpeter swans in the harvest. Annual unintentional take of trumpeter swans has been well below limited quotas, described under the 2003 EA, in Utah and Nevada (the two states that are enforced by a quota) (USFWS 2003).

Non-Consumptive Uses

Trumpeter swans are enjoyed by bird enthusiasts, and are considered a premier icon of the intermountain west for wetland restoration. Thriving in clean waters and high-quality habitats they are considered an "indicator species" of healthy wetlands and waterways (The Trumpeter Swan Society 1986). Non-consumptive use of wetlands in North America, has grown over time and was recognized in the 2012 Revision of the North American Waterfowl Management Plan (2012 NAWMP).

Genetic Analysis

The entire species appears to have gone through two separate bottlenecks: one in the Pleistocene period (likely associated with the glacial period) and one in the 20th century when most of the population was eliminated through commercial hunting (Oyler-McCance et. al 2007). A rangewide genetic survey of trumpeter swans by Oyler-McCance et. al (2007), demonstrated significant differences in genetic structure between the Pacific and the Rocky Mountain populations, supporting current management as separate populations. The Yukon Territory is an area of overlap between the two populations. Considering both mtDNA and microsatellite data sets, the Alberta/British Columbia and the Tri-State populations are not genetically different and need not be managed separately from a genetic standpoint. Although there is slightly more genetic structure in the Pacific Population, especially in the Alaskan Copper River Delta group, all sampling locales had relatively similar levels of genetic diversity.

MANAGEMENT ISSUES

1. The current population goal has been met; however, current distribution of the various Greater Yellowstone and restoration flocks has not yet reached desired levels. The current breeding distribution remains restricted and this segment is still at risk from a variety of factors including: declines in existing nesting habitat quality due to disturbance or water supply problems, insufficient quality wetland nesting habitat, and loss of wintering habitat. Rapid increases in human population and development in the Greater Yellowstone area and elsewhere across the RMP range are a growing concern. Habitat loss, destruction, and fragmentation threaten swan wetland habitats and highlight the importance to protect key nesting, migration, and winter habitats. The need to protect and manage existing summer and winter habitat use areas, and where possible, to restore and enhance wetlands that can provide additional summer habitat for nesting pairs and non-breeding subadults is needed within each state.

    a. The fall survey is essential to monitor progress towards management goals and objectives in this plan; loss of funding for this survey would make it challenging for managers to assess changes in swan abundance, productivity and distribution, or to detect problems that could impact conservation of this population; consequently, it is important to maintain funding for the fall survey.

2. A substantial proportion of white birds and nesting pairs of the U.S. breeding segment are closely linked to impounded and/or managed wetlands on National Wildlife Refuges (NWRs). Declining refuge system funding and policy changes could jeopardize the monitoring and habitat management needed to maintain successful swan nesting on key NWRs.

3. Conservation issues across the Canadian breeding range of RMP trumpeter swans (Alberta, British Columbia, Northwest Territories and the Yukon) are associated with land use, land development and land management. Large exploration and development projects, pipelines, forestry practices, and road expansion are present and have occurred across the RMP Canadian breeding range in Alberta and British Columbia, although the negative impacts of these activities is unknown. Current management of the boreal forest and activities associated with these activities may result in wetland loss, wetland degradation, or overall changes in the hydrology of the boreal forest.

4. Although the population has continued to grow, population growth is known to be sensitive to adult mortality rate of this long-lived species. In addition to winter severity, mortality from powerline collisions, lead poisoning, and poaching can at times have local impacts, particularly in restoration flocks when breeding pair numbers are low.

5. If abundance and distribution of RMP trumpeter swans continues to expand due to successful conservation efforts and natural population growth, quotas may need to be adjusted to accommodate a potential increase in incidental take.

State Specific Management Issues

Idaho

The breeding population is limited by suitable nesting wetlands. Primary factors that make wetlands unsuitable for trumpeter swans nesting include inadequate season-long water supply and human disturbance. Given the small number of active breeding territories in eastern Idaho, management that maintains viable habitat, including security from human disturbance should continue to be a considered.

Bear Lake National Wildlife Refuge (BLNWR). Historically, wetlands around Bear Lake most likely supported nesting and migratory trumpeter swans, which continue to nest on the refuge and are a focal species for management actions.

Management issues for the refuge include changes in habitat quality, decadent bulrush stands, little open water and submerged aquatic vegetation (SAV) availability, carp causing reduction in SAV, no independent water control of Mud Lake unit (which is a large proportion of the land base on the refuge) and risk of powerline mortality (B. Wishnek, refuge biologist, pers. com).

Camas National Wildlife Refuge (CNWR). Trumpeter swans were documented on the refuge prior to 1976, with documented nesting since at least 1976. Management issues for the refuge include the ability to maintain semi-permanent wetlands for nesting swans due to the water table

in the refuge area dropping approximately 15 feet since the 1980's and extensive cost of running wells to maintain these wetlands (P. Johnson refuge biologist, pers. com.).

Grays Lake National Wildlife Refuge (GLNWR). Trumpeter swans were extirpated from Grays Lake since the 1920s and 67 swans were relocated to Grays Lake from 1988 to 1991 in an attempt to reestablish the refuge as a breeding area. Trumpeter swans have been documented as nesting almost every year since, with an average of eight to ten nesting pairs. Management issues for the refuge include rapid water level drawdowns decreed in the 1965 agreement among BIA, FWS and riparian landowners, and loss of sufficient interspersion of open water to emergent vegetation (P. Johnson refuge biologist, pers. com.).

Wyoming

In the state of Wyoming, outside of Yellowstone National Park, total number of white birds and number and distribution of nesting pairs have increased over the past two decades as a result of the Green River range expansion project (Patla and Oakleaf 2004, Patla 2015). In the core Snake River area, however, no growth has occurred and only a few nest sites consistently fledge young. Loss of these sites could result in future population declines. Accessibility to supplemental food at some sites in winter may be exasperating the situation over time by attracting and holding migrants in the Jackson area.

The National Elk Refuge and Seedskadee National Wildlife Refuge are the most important management units for swans in western Wyoming. These areas both provide habitat for swans throughout the year and nesting swans on these refuges produce a high percentage of fledged cygnets in the Snake and Green River areas respectively. Loss of existing managed wetlands that provide nesting/summer habitat at either refuge would result in a decline in the resident Wyoming trumpeter swan population.

The National Elk Refuge (NER). The NER supports the highest number of consistently occupied nest sites in the core Snake River area. In early November, the Flat Creek marsh is a major staging area for both resident and migrant swans and hundreds of swans concentrate there until freeze-up occurs. Management issues identified by the refuge include, effects of water diversion from the Gros Ventre River to Flat Creek which likely causes nest flooding in some years, possible selenium problems in ponds on the north end of the refuge, lack of funding to implement wetland improvements identified in the NER Comprehensive Conservation Plan, and forage competition between migratory and resident birds during winter months (Eric Cole, NER biologist, pers. com.)

Seedskadee National Wildlife Refuge (SNWR). SNWR and its managed wetland complexes have been key in the recovery of swans in the Green River range expansion area of Wyoming (Patla and Oakleaf 2004). SNWR also winters up to 200+ swans including most of the Green River resident population plus other long-distant migrants. Low velocity flows and abundant submerged, aquatic vegetation provide ideal winter habitat for swans and a large number of other waterfowl. Management issues for the refuge include crowding and interference by subadults on existing wetland nesting areas, future management of flows from Fontenelle Reservoir, increasing popularity of fishing and boating on the Green River, illegal shooting during

permitted waterfowl seasons, and reduced staff and funding for maintaining managed wetlands (T. Koerner, refuge manager, pers. com.).

Yellowstone National Park (YNP)). YNP supports resident, relative sedentary trumpeter swans year-round, as well as regional migrants from the Greater Yellowstone area and longer-distance migrants from Canada and elsewhere during winter. 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 RMP has increased from <1,000 to >5,000 swans (McEneaney 2006, Grove 2012). 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, human disturbance, and effects of sustained drought and predation on productivity (Smith and Chambers 2011; YNP 2012). Managers at YNP 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. A ten-year plan (YNP 2012) was developed for YNP and subsequently reintroductions are being implemented and more aggressive management actions through grafting cygnets and installing nest platforms. This has increased the population and new pairs are forming but new reproduction has yet to be documented. (D. Smith, NPS biologist per.com).

Grand Teton National Park (GTNP). GTNP supports resident trumpeter swans as well as regional migrants in the winter from Greater Yellowstone and long-distance migrants from Canada and other locations to the north. Historically nesting pairs in GTNP contributed to the recovery of this species in western Wyoming and Greater Yellowstone since the 1930s. In recent years, GTNP has continued to provide habitat for nesting and wintering swans. However, water levels have decreased substantially at some sites due to drought or undetermined causes. In addition, increased human activities and predation may be affecting important seasonal and summer habitats. (S. Patla, WGFD, pers. com.).

Montana

Red Rocks Lakes National Wildlife Refuge (RRLNWR). RRLNWR in the Centennial Valley of southwest Montana supports one of the most productive breeding populations of trumpeter swans in Idaho, Montana, and Wyoming. Water level management allows for natural flow regimes where water levels increase following snowmelt of both the valley floor and mountaintop runoff. This is in comparison to historic water level management where water levels were kept at constant levels throughout the summer months.

Potential conservation concerns facing RRLNWR include parasite exposure to cygnets, loss of open water habitat due to expansion of emergent sedge habitats, potential for invasion of aquatic invasive species, and earlier snowmelt runoff from climate warming that influence late-summer water levels. Conservation issues occurring off-refuge include increased human disturbance during late summer on Elk Lake, connectivity to wetlands in the western Centennial Valley, and reductions of water or dewatering entirely of wetlands used by trumpeter swans (K. Cutting refuge biologist pers. com.).

Oregon

Malheur NWR (MNWR). MNWR supports resident, relative sedentary trumpeter swans year-round, as well as a few migrants. The refuge population peaked at 75 white birds counted in late summer in 1992 (Ivey et al. 2000) and has since declined to less than 10. This flock has not developed migrational traditions and winter food availability has limited the number of swans which can survive through the harsh winter period. Management of ponds for submergent plant production provides the major food resources; however, management capabilities are severely limited by the poor condition of water control facilities and also by the negative impacts of carp (associated with many of the refuge ponds and marshes). Late season (September) brood water is a critical factor which is often in short supply during dry years.

Summer Lake WA (SLWA). SLWA is the approved release site for the Oregon restoration program, and since, has supported resident and migrant trumpeter swans. The number of migrants moving through SLWA has increased to >200 in recent years. The area has excellent habitat and food resources to support nesting wintering swans. One issue is that water supplies are declining due to overdrawing of the aquifer for crop irrigation in the region.

Washington

Trumpeter swan conservation in eastern Washington, has to date, been focused upon breeding swan efforts on Turnbull NWR. While this was a release site for trumpeter swans from Red Rock Lakes genetic stock, the origin of other trumpeter swans that frequent the refuge are unknown. Before captive-release or translocation efforts will be considered, more information on swan distribution, abundance, age-ratios, winter habitat and breeding origin of birds in eastern Washington is needed.

MANAGEMENT ACTIONS

The following priority management actions are recommended. The degree and timing of their implementation by the responsible agencies will be subject to staffing, budgetary, and legislative constraints beyond the scope of this plan. Whenever possible, management procedures in this plan should be coordinated and consistent with those for other populations of Pacific Flyway birds, particularly those for Pacific Coast trumpeter swans and Western tundra swans.

Population

1. Monitor the entire RMP (U.S. and Canadian breeding segments) periodically (at about 5-year intervals) via the North American Trumpeter Swan Survey.

    - Lead Agencies: USFWS-DMBM (Primary Lead), USFWS-Migratory Bird Program Region 1, 6, 7, and 8, CWS
    - Participating: IDFG, MFWP, WGFD, ODFW, CSKT, USFS, USNPS (YNP and GTNP), USFWS- NWRS, Regions 1, 6, 7, 8
    - Priority: 1
    - Schedule: 2020, 2025

2. Monitor the U.S. breeding segment during an annual post-breeding season (September) fall survey. Record data in a manner that clearly distinguishes pairs with broods, brood size, and the distribution of pairs with young. Monitoring data from fall surveys will be maintained by the USFWS, Regional Division of Migratory Bird Management (DMBM), Lakewood, CO.

    The USFWS will analyze all available data following the fall survey and prepare a progress report on the status of the U.S. breeding segment including an assessment on progress made toward achieving plan goals and objectives. The fall survey will remain a priority for Council.

    - Lead Agencies: Pacific Flyway Council, USFWS-DMBM, USFWS- Migratory Bird Programs Region 6 (primary lead), Region 1, Region 8.
    - Participating: IDFG, MFWP, WGFD, ODFW, CSKT, USFS, USNPS (YNP and GTNP), USFWS- NWRS Regions 1, 6, 8
    - Priority: 1
    - Schedule: Annually

3. Reach desired distribution of adults, sub-adults, nesting pairs, or nesting pairs with young as described in Table 1. Values in the table are goals for the five-year planning period and do not represent long-term goals necessary for population persistence. Future plan iterations will likely include increased values, particularly in the Greater Yellowstone Ecosystem, where restoration efforts are ongoing.

    - Lead Agencies: USFWS-DMBM
    - Participating: IDFG, MFWP, WGFD, ODFW, WDFW, CSKT, USFS; USNPS (YNP and GTNP), Shoshone-Bannock Tribes, USFWS-NWRS, Regions 1, 6, 8
    - Priority: 1

- Schedule: Annually

4. Maintain a well distributed, self-sustaining RMP Canadian Breeding Segment throughout Western and Northern Canada.

    - Lead Agencies: CWS, Alberta Environment and Parks
    - Participating:
    - Priority: 1
    - Schedule: Ongoing

5. Contribute to the revision of State Wildlife Action Plans as needed to incorporate objectives for monitoring the Greater Yellowstone flocks and restoration flocks in Idaho, Montana, Wyoming, Oregon, and Washington.

    - Lead Agencies: IDFG, MFWP, WGFD, ODFW, WDFW
    - Participating:
    - Priority: 3
    - Schedule: As state plans are revised

Table 1. Desired distribution of adults and subadults (white birds), and nesting pairs with fledged young (broods) counted during the fall survey. Current status data (in parentheses) are from 2016.

Location	Pairs with fledged young (broods)		Adults and subadults (white birds)	
MONTANA				
Centennial Valley[A]	**19**	(18)	**200**	(197)
Madison Valley	**5**	(2)	**20**	(2)
Paradise Valley	**5**	(2)	**30**	(18)
Blackfoot	**10**	(5)	**40**	(27)
Flathead / NW Montana*[B] *Northwest Montana, from Mission valley north to Canadian border, and from Idaho border to the Mission Swan and Glacier National Park	**20**	(15)	**250**	(138)
WYOMING[C]				
Yellowstone National Park[D]	**4**	(2)	**30**	(23)
Snake River Core	**7**	(7)	**68**	(61)
Green River Expansion	**25**	(17)	**170**	(149)
Salt River Expansion	**2**	(0)	**6**	(3)
IDAHO[E]				
Island Park - Core	**8**	(5)	**65**	(62)
Ashton-Idaho Fall – Core * *Includes Camas NWR, Henry's Fork and associated wetlands, Market Lake WMA, Mud Lake WMA, and Sand Creek WMA	**6**	(1)	**40**	(28)
Teton Basin	**3**	(0)	**15**	(1)
Grays lake NWR area - expansion	**3**	(1)	**30**	(16)
Fort Hall Expansion	**1**	(0)	**15**	(3)
Bear Lake NWR area – Expansion	**3**	(3)	**25**	(18)
OREGON[F]				
Malheur NWR/Harney County	**5**	(1)	**25**	(no data)
Central Oregon (Klamath Basin) / Summer Lake	**10**	(2)	**50**	(13)
NEVADA[G]				
Ruby Lake NWR	**3**	(0)	**12**	(2)
WASHINGTON[H]				
Turnbull NWR	**2**	(2)	**9**	(6)

[A] CV — White birds calculated using the average 2012-2016

[B] FV/NW MT — Conservative estimated based on past years observations and growth.

[C] WY — Based objectives for number of broods with fledged young based on population model using the average lambda for 2007–2016. The total number of white birds, used lambda 2015/2016.

[D] YNP — Based on breeding pairs (not pairs with fledged young). White birds set based on 66% of all time high.

Table 1. Continued.

[E] ID	Calculated using lambda and geometric mean based on data from the previous 10 and 20-year interval (1996-2016) to predicted growth and project population goals for 2017-2021
[F] OR	Unchanged from the 2012 plan
[G] NV	Objective is based on breeding pairs (not pairs with fledged young)
[H] WA	Numbers reflect the intent of maintenance of current numbers, with natural flock growth

Trumpeter Swan Translocations

1. Identify and prioritize new areas and projects for swan releases with potential to (i) support nesting pairs and broods (ii) connect and expand the breeding range (iii) support the desired distribution of breeding RMP trumpeter swans and (iv) develop new sites which may be used as new wintering areas. Develop and use spatial modeling tools to inform this evaluation.

    - Lead Agencies: USFWS Partners for Fish and Wildlife Program, Pacific Flyway RMP Trumpeter Swan Subcommittee, IDFG, MFWP, WGFD
    - Participating: GYTSWG, WWS
    - Priority: 1
    - Schedule: Ongoing

2. Support state and regional efforts to increase swan translocation efforts in the Greater Yellowstone area; identify sites suitable for habitat enhancement and/or translocations. Priority sites are most likely to occur on state/federal managed wetlands and conservation easement properties, where human disturbance can be minimized.

    - Lead Agencies: USFWS, IDFG, MFWP, WGFD
    - Participating: GYTSWG, WWS
    - Priority: 2
    - Schedule: Ongoing

3. Obtain the support and approval of Council for all proposals that call for new releases. Project proposals should be reviewed by the GYTSWG and the RMP trumpeter swan Subcommittee prior to consideration by Council.

    - Lead Agencies: USFWS, Pacific Flyway RMP Trumpeter Swan Subcommittee
    - Participating: GYTSWG, WWS
    - Priority: 2
    - Schedule: Ongoing

4. Sources of available trumpeter swans should be reviewed by Council and swan allocation should only occur on approved project sites (Appendix E). The allocation should be reviewed annually by the RMP Trumpeter Swan subcommittee and the GYTSWG for Council consideration

    - Lead Agencies: USFWS, Pacific Flyway RMP Trumpeter Swan Subcommittee, WWS,
    - Participating: GYTSWG, IDFG, MFWP, ODFW, WGFD, WDFW; USNPS (YNP and GTNP), CSKT
    - Priority: 2
    - Schedule: Ongoing

5. Annually review the number of birds to be released in each state and Council approved project sites until approved project objectives are achieved or until the project is deemed unsuccessful. Progress toward desired objectives described in Table 1 should be reviewed

annually.

- Lead Agencies: USFWS, Pacific Flyway RMP Trumpeter Swan Subcommittee, WWS.
- Participating: GYTSWG, IDFG, MFWP, ODFW, WGFD, WDFW; USNPS (YNP and GTNP), CSKT
- Priority: 2
- Schedule: Ongoing

6. Release captive–reared trumpeter swan cygnets or yearlings of RMP origin in Idaho, Montana, and Wyoming, but may be RMP or PCP origin in Oregon and Washington. Release of trumpeter swans may only occur at sites approved by Council and should be conducted in accordance with the Pacific Flyway RMP Study Committee and Council approved release and transportation protocol (Appendix F)

    - Lead Agencies: USFWS, Pacific Flyway RMP Trumpeter Swan Subcommittee, WWS.
    - Participating: GYTSWG, IDFG, MFWP, WGFD, ODFW, WDFW, USNPS (YNP and GTNP), CSKT
    - Priority: 1
    - Schedule: Ongoing

7. 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. Report sightings and other encounters of marked swans to the National Bird Banding Laboratory.

    - Lead Agencies: IDFG, MFWP, WGFD, ODFW, WDFW, CSKT, USNPS (YNP and GTNP), WWS, TTSS, USFWS
    - Participating:
    - Priority: 2
    - Schedule: On going

8. Relatedness and sex of birds to be released should be evaluated for all restoration projects and a consideration for captive-bred stock sources.

    - Lead Agencies: USFWS
    - Participating: WWS, IDFG, MFWP, ODFW, WGFD, WDFW; USNPS (YNP and GTNP), CSKT
    - Priority: 2
    - Schedule: Ongoing

9. Consider use of egg salvage collection techniques in years with high run off and high potential that nests may become flooded.

    - Lead Agencies: USFWS, WWS
    - Participating: IDFG, MFWP, ODFW, WGFD, WDFW; USNPS (YNP and GTNP), CSKT

- Priority: 3
- Schedule: Ongoing

Mortality

1. Continue to monitor for disease problems in swans and other waterfowl particularly in winter concentration areas.

    - Lead Agencies: USFWS, IDFG, MFWP, WGFD, ODFW, WDFW, CSKT, Blackfoot Challenge, USNPS (YNP and GTNP)
    - Participating: NRTSS, WWS.
    - Priority: 2
    - Schedule: Ongoing

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

    - Lead Agencies: USFWS, IDFG, MFWP, WGFD, ODFW, WDFW, CSKT, Blackfoot Challenge, USNPS (YNP and GTNP)
    - Participating: NRTSS, TTSS, GYTSWG
    - Priority: 2
    - Schedule: Ongoing

3. Consider use of non-toxic fishing tackle where there is potential for swans to ingest tackle lost by anglers.

    - Lead Agencies: USFWS-Refuges, IDFG, MFWP, WGFD, ODFW, WDFW
    - Participating: USFS, BLM, CSKT, USNPS (YNP and GTNP)
    - Priority: 3
    - Schedule: Ongoing

4. Establish partnerships with power companies and implement powerline mitigation initiatives at key sites to reduce swan mortality.

    - Lead Agencies: IDFG, MFWP, WGFD, ODFW, WDFW
    - Participating: USFWS, NRTSS, TTSS
    - Priority: 2
    - Schedule: Ongoing

Habitat

1. Inventory availability and suitability of seasonal habitats throughout the range of RMP U.S. breeding segment and work cooperatively with partners to develop spatial models to evaluate suitable breeding habitat and connectivity potential.

- Lead Agencies: USFWS Partners for Fish and Wildlife Program
- Participating: IDFG, MFWP, WGFD, USFS; NRTSS, TTSS, WWS, USNPS (YNP and GTNP), TNC-WY
- Priority: 1
- Schedule: Ongoing

2. Identify and implement wetland development, restoration, enhancement, and conservation projects for RMP trumpeter swans, with emphasis on developing additional high quality breeding and summer habitat needed to increase population and distribution for the U.S. Breeding Segment.

    - Lead Agencies: IDFG, MFWP, ODFW, NDOW, UDWR, WDFW, WGFD
    - Participating: USFS, BLM, Natural Resource Conservation Service, CSKT, Shoshone-Bannock Tribes, Intermountain West Joint Venture, NRTSS, TTSS, WWS, local land trusts, local Conservation Districts, Ducks Unlimited.
    - Priority: 1
    - Schedule: Ongoing

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

    - Lead Agencies: USFWS, IDFG, MFWP; WGFD
    - Participating: NRTSS, WWS, TTSS
    - Priority: 2
    - Schedule: Ongoing

4. Establish partnerships with NGOs and the private sector to accomplish priority management strategies to protect, enhance and increase trumpeter swan summer and wintering areas.

    - Lead Agencies: IDFG, MFWP, WGFD
    - Participating: NRTSS, CTNF, BTNF, USFWS- NWRS Regions 1, 6, 8
    - Priority: 2
    - Schedule: Ongoing

5. Adopt management activities that promote suitable nesting wetlands by managing for season long water supply. Also adopt management activities that maintains viable habitat, including security from human disturbance, primarily fishing and boating, particularly at suitable nesting wetlands where there is potential for, or in areas of current territories.

    - Lead Agencies: IDFG, MFWP, WGFD, USFWS- NWRS Regions 1, 6, 8
    - Participating: NRTSS, WWS, TTSS
    - Priority: 3
    - Schedule: Ongoing

6. Establish land conservation partnerships led by local land trusts to protect river corridor habitat through acquisition of permanent conservation easements. Federal and state agencies should continue to work with land trusts to help secure funding to expand protection of important swan wintering and transitional habitat and expand conservation easement protection on priority swan nesting habitat.

    - Lead Agencies: IDFG, MFWP, WGFD
    - Participating: NRTSS, CTNF, TTSS
    - Priority: 2
    - Schedule: Ongoing

7. Identify areas for creating and improving wetland habitat for swans through beaver restoration projects and implement projects where possible.

    - Lead Agencies: IDFG, WGFD, MFWP, USFS, USFWS
    - Participating: NRTSS, WWS
    - Priority: 3
    - Schedule: Ongoing

8. On the Canadian breeding grounds, continue to 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 Environment and Parks, British Columbia Ministry of Environment, Environment Yukon
    - Participating: Ducks Unlimited Canada, TTSS
    - Priority: 2
    - Schedule: Ongoing

9. First Nation's views on, and approaches to land management, monitoring and population management need to be integrated into planning and delivery of conservation programs over some of the RMP trumpeter swan breeding areas in Canada.

    - Lead Agencies: CWS, Alberta Environment and Parks, British Columbia Ministry of Environment, Environment Yukon
    - Participating:
    - Priority: 2
    - Schedule: Ongoing

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

    - Lead Agencies: CWS, Alberta Environment and Parks
    - Participating:
    - Priority: 2

- Schedule: Ongoing

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

    - Lead Agencies: CWS, Alberta Environment and Parks, British Columbia Ministry of Environment
    - Participating:
    - Priority: 2
    - Schedule: Ongoing

Harvest

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 and western tundra swan populations. Compatible swan hunting includes a limited take 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.

    - Lead Agencies: USFWS
    - Participating: MFWP, NDOW, UDWR
    - Priority: 1
    - Schedule: 2017-2021

2. Continue to monitor swan harvest in Montana, Nevada, and Utah and ensure mortalities of trumpeter swans harvested during swan hunts are well documented. The swan season will be closed if take of trumpeter swans permitted by regulation is reached in Utah or Nevada.

    - Lead Agencies: USFWS
    - Participating: MFWP, NDOW, UDWR
    - Priority: 1
    - Schedule: 2017-2021

3. Continue to inform swan hunters of the difference between tundra and trumpeter swans through hunter identification material.

    - Lead Agencies: USFWS
    - Participating: MFWP, UDWR
    - Priority: 2
    - Schedule: Ongoing

4. Develop and distribute interpretive materials 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: WGFD, MFWP, IDFG
    - Participating: NRTSS, TTSS
    - Priority: 3
    - Schedule: Ongoing

Future information needs

1. Develop and maintain a prioritized list of research and information needs (described below) to be accomplished over the next 5–10 years. The RMP Trumpeter Swan Subcommittee will review, update and prioritize the list annually.

    - Lead Agencies: Pacific Flyway RMP Trumpeter Swan Subcommittee
    - Participating: All interested partners
    - Priority: Described below
    - Schedule: Annually

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

    1. Adopt a multi-state, multi-agency approach to 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. Establish a working group to facilitate this work. (H)

    2. Explore options for additional appropriate sources of captive-reared trumpeter swans that can expand and expedite translocation efforts. New sources should be of the appropriate genetic origin and genetic purity. All sources should be in compliance with disease protocols. (M)

    3. Develop and define objectives for an operational banding program to capture, leg band, 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)

    4. Determine if there is a need to warrant ending the current genetic requirement to only use RMP birds for current restoration efforts (excluding OR and WA). Obtain and analyze genetic samples from swans trapped during winter in eastern Washington and eastern Oregon to determine their genetic origin (PCP or RMP) and mark a sample of the same swans with transmitters to determine breeding location. (L)

    5. Use radio telemetry (satellite or GPS) and/or marking of wild birds including cygnets to better understand wintering locations and determine if RMP swans have successfully expanded their winter distribution to undetected locations. (L)

    6. 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. Ascertain the

seasonal movements of Canadian and Tri-state trumpeter swans using satellite tracking of transmitters. (L)

ANNUAL REVIEW

The Pacific Flyway RMP Trumpeter Swan Subcommittee shall meet annually, or as needed, to review progress towards achieving the goal and objectives of this plan, and to recommend actions and revisions. The Subcommittee shall report to the Pacific Flyway Council through the Pacific Flyway Study Committee, and to 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 on accomplishments and shortcomings of the cooperative management efforts. The Subcommittee shall be composed of representatives from CWS, USFWS, and state and provincial agencies responsible for management of the RMP including representatives from the states of California, Washington, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming, USFWS's Regional Migratory Bird Chiefs from Region 6 (Denver, CO), Region 1 (Portland, OR) and Region 8 (Sacramento, CA), The Trumpeter Swan Society, and such other members as the Subcommittee deems appropriate to appoint.

Annually, a summary of data collected during the preceding 12 months should be prepared as a brief synopsis and presented at the February GYTSWG meeting. 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, problems encountered, and other relevant information). This will be compiled by the Chair of the RMP Trumpeter Swan Subcommittee for the March and September meeting with input from all appropriate sources.

Wyoming Wetlands Society provide an estimate of available captive-reared cygnets at the GYTSWG meeting annually. This will allow the allocation of hatch year cygnets produced by WWS to be decided at the March Flyway meeting, from recommendation from WWS and GYTSWG.

Approved captive-reared trumpeter swan projects must provide an annual progress report detailing the number, source and sex of birds, monitoring efforts and results (as described in Appendix E). It must also detail progress toward meeting project objectives. The progress report must be submitted to the GYTSWG prior to their annual meeting so that members can review progress toward project objectives and develop recommendations for subsequent captive-reared swan releases. Progress reports also should be submitted to the Pacific Flyway Study Committee's chair of the Rocky Mountain Population of Trumpeter Swan Subcommittee.

It is the responsibility of those subcommittee members to assure that the objectives and procedures of this plan are integrated and coordinated with those plans and activities of the various wildlife and land management agencies and local planning systems within their agency's purview. Chairmanship will be appointed biennially and rotated among member agencies (except for Canadian agencies).

The Subcommittee will exercise its prerogative to invite to attend and participate as an ex officio member at meetings any individual, group, agency, or representative whose expertise, counsel, or managerial capacity is required for the coordination and implementation of management programs. The chairmanship will rotate as follows:

Montana	2015–2017
Idaho	2018–2019
Utah	2020–2021
Nevada	2022–2023
Montana	2024–2025
Idaho	2026–2027

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APPENDICES

APPENDIX A. Status of Rocky Mountain Population of trumpeter swan flocks as determined by summer, range-wide surveys in 1985, 1990, 1995, 2000, 2005, 2010, and 2015.

	1985			1990			1995			2000			2005		
Location	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total
California (Lower Klamath NWR)							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 A. Continued.

	2010			2015			2020			2025			2030		
Location	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total	Adults	Cygnets	Total
Idaho	101	29	130	104	47	151									
Montana	130	30	160	358	142	500									
Nevada (Ruby Lakes NWR)				2	0	2									
Oregon	17	1	18	24	3	27									
Washington	2	5	7												
Wyoming	149	48	197	232	71	303									
U.S. flocks subtotal	399	113	512	720	263	983									
Alberta[b]															
British Columbia															
Northwest Territories															
Saskatchewan															
Yukon															
Canadian flocks subtotal															
RMP summer total															

[b] In 2010 and 2015 the survey was conducted under a new survey protocol in Canada.

https://www.fws.gov/migratorybirds/pdf/surveys-and-data/NATrumpeterSwanSurvey_2015.pdf

APPENDIX B. USFWS Fall Survey of the Rocky Mountain Population/U.S. Breeding Segment of trumpeter swans, 1931–2015. Note that USFWS 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 B. 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 B. 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
2008	140	7	147	112	5	117	127	36	163	9	3	12	0	0	0	20	0	20
2009	138	21	159	122	21	143	101	33	134	4	2	6	13	0	13	22	0	22
2010	129	30	159	101	29	130	145	48	193	2	0	2	13	0	13			
2011	123	40	163	98	12	110	133	37	170	5	0	5	17	0	17	15	0	15
2012	129	96	225	97	30	127	155	52	207	7	0	7	17	10	27	5	0	5
2013	208	26	234	80	28	108	167	52	219				24	1	25	20	0	20
2014	198	57	255	74	23	97	180	57	237	2	1	3	18	1	19			
2015[d]	358	142	500	104	47	151	232	68	300	4	1	5	20	2	22	2	0	2
2016	453	108	561	127	28	155	236	67	303				13	10	23	2	0	2

[a] Swans translocated to Summer Lake WMA beginning in winter 1991.
[b] Blanks denote survey was not conducted.
[c] Incomplete count.
[d] Begins the inclusion of the Flathead Indian Reservation swans from their reintroduction program which is now part of the operational fall survey into Montana totals

APPENDIX C. USFWS Midwinter Surveys of the Rocky Mountain Population of trumpeter swans, 1972–2015.

	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 C. 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
2008	382	25	407	2694	616	3321	668	149	817	12	2	14	37	14	51	25	2	27
2009	168	21	189	3393	740	4133	726	112	838	17	3	20	36	12	48	37	0	37
2010	274	64	338	2631	501	3132	648	111	759	7	2	9	14	12	26	26	0	26
2011	307	121	428	3068	918	3986	910	266	1173	7	3	10	59	19	78	33	4	37
2012	262	18	280	3537	936	4993	858	152	1010	13	3	16	77	16	93	36	3	39
2013	404	101	505	3860	883	4743	882	170	1052	3	0	3	67	18	85	28	9	37
2014	390	27	417	3471	365	3836	819	123	942				130	11	141	30	2	32
2015[f]	494	128	622	4086	1006	5092	887	188	1075	11	2	13	109	22	131			

[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.
[f] The Mid-winter survey was discontinued in 2015.

APPENDIX D. Results of the Canadian Wildlife Service's late summer surveys of the Grand Prairie flock of the Rocky Mountain Population of trumpeter swans, 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 D. 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[c]	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.

[c] In 2010 and 2015 this was conducted as part of the quinquennial survey

APPENDIX E. Protocol for allocation of captive-reared trumpeter swans for release.

Adopted by the Pacific Flyway Council March 10, 2015

Approved projects: Captive-reared trumpeter swans may only be released at project areas that have received prior approval by the Pacific Flyway Council. The list of approved project areas and status will be maintained by the chairperson of the Trumpeter Swan subcommittee. Project areas with Council approval as of June 2017 are listed in Table 1.

Table 1. List of Pacific Flyway Council approved project areas for release of captive-reared Trumpeter Swans as of June 2017

Site	Year approved	Status	Last release
Upper Green River, WY	2002	Inactive/Project completed	2003
Bear Lake, ID	2002	Inactive/ Project discontinued	2004
Flathead Indian Reservation, MT	2002	Active	2016
Blackfoot Valley, MT	2004	Active	2016
Fort Hall Indian Reservation, ID	2007	Inactive	2010
Summer Lake WMA, OR	2008	Active	2016
Middle Madison River Valley, MT	2012	Active	2016
Yellowstone National Park, WY	2012	Active	2016
Teton Basin, ID	2013	Active	2017

Captive trumpeter swans obtained as a result of egg salvage may be released at any area consistent with Pacific Flyway Council approval. In March 2006, the Pacific Flyway Council approved salvage of eggs that are destined for flooding or abandonment in the tri-state (Idaho, Montana, and Wyoming) region, and grafting of cygnets back to parents from those salvage areas shortly after hatching. Egg salvage is not intended to produce stock for approved projects, but may be an appropriate conservation tool applicable in such events as flooding or loss of one or both nesting adults incubating eggs.

Project status: Active projects will receive priority for releases of captive-reared trumpeter swans over inactive projects. Each project will become active upon initial project approval by the Council. A project will become inactive when: (1) no swans are released for that project during a period of 24 consecutive months, (2) no annual report on the progress of that project is provided in the year it is due, or (3) project objectives are achieved or the project is otherwise considered to be completed by project leads.

The annual progress report must detail monitoring efforts and results. It must also detail progress toward meeting project objectives. The progress report must be submitted to the Greater Yellowstone Trumpeter Swan Working Group (GYTSWG) prior to their annual meeting so that members can review progress toward project objectives and develop recommendations for subsequent captive-reared swan releases. Progress reports also should be submitted to the Pacific Flyway Study Committee's chair of the Rocky Mountain Population of Trumpeter Swans Subcommittee (Subcommittee).

Inactive projects need Council approval to become active following the process for establishment of new projects.

New projects: Council approval of new projects and associated areas for releases of captive-reared trumpeter swans is contingent on: 1) consistency with objectives of the Pacific Flyway Council's management plan for the Rocky Mountain population of trumpeter swans, 2) completion of a habitat assessment, 3) clearly stated objectives for establishment of nesting-pairs, and 4) a monitoring program to document project progress and evaluate project success. The habitat assessment must demonstrate that the quality and quantity of habitat in a project area is sufficient to result in high probability of project success. New projects should be vetted through the GYTSWG and RMP Trumpeter Swan Subcommittee.

Annual process for requesting and allocating swans for release: Project leads should vet requests for captive-reared trumpeter swans through the GYTSWG at the GYTSWG's annual meeting. The GYTSWG is encouraged to make a recommendation to the Subcommittee on the annual allocation of swans among Council-approved projects based on the expected availability of captive-reared Trumpeter Swans. The recommendation from the GYTSWG should be provided to the chair of the Subcommittee prior to the Subcommittee's annual regulatory meeting.

Annually at the Subcommittee's regulatory meeting, the Wyoming Wetlands Society (WWS) will report on the number of captive-reared trumpeter swans expected to be available for the Pacific Flyway releases, and the expected cost per bird, if any, to the project receiving them. A representative of each Council-approved project may submit a request for the number of captive-reared trumpeter swans they would like to release in the upcoming annual release period. The request should be submitted to the chair of the Subcommittee at or before the Subcommittee's annual regulatory meeting. Project leads must specify if they expect to have swans available for release from sources other than those designated for Pacific Flyway release from the WWS, the expected number of swans available from this alternative source, and provide test results demonstrating genetic compatibility with Trumpeter Swans from the Rocky Mountain population.

At the Subcommittee's annual regulatory meeting, the Subcommittee will make a recommendation to the Study Committee and Council for review and approval on the tentative allocation of swans among projects during the subsequent 12-month period from those swans expected to be available for release. The Subcommittee will establish the tentative allocation of available swans among projects based on: (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 approved and whether the project is active, (3) whether swans from the site are likely to winter outside of the core tri-state area according to the objectives of the management plan, (4) project stage and progress toward meeting nesting-pair objectives, and (5) the level of commitment among project partners to monitor project progress and evaluate project success. Release of a large ($\geq$10) number of swans may be acceptable during the first year or two of a project, but after that time, release of a small (<10) number of swans over more projects may be more effective in minimizing disturbance to newly established nesting pairs and encouraging the establishment of new nesting pairs. The Subcommittee will consider input from the GYTSWG, WWS, and Fish and Wildlife Service Pacific Flyway Representative.

The Study Committee and Council may make adjustments to the tentative allocation of swans for release recommended by the Subcommittee. The final tentative allocation will be established by the Pacific Flyway Council.

The allocation of captive-reared swans to areas outside of the tri-state region will be constrained to no more than 20% of the total number of swans available for release in the tri-state region in any year.

After the nesting season, when the number of captive-reared swans available for release can be determined with greater certainty from all sources, the WWS will compare the swans available for release to the tentative allocation to determine any shortfall or excess. If there is a shortfall, the WWS will work with project leads to make any necessary adjustments to the tentative allocation. The WWS will make a recommendation to project leads and the US Fish and Wildlife Service's Pacific Flyway Representative on any adjustments needed to the tentative allocation to increase the probability of achieving maximum progress on all project objectives, while adhering to the intent of the Council's approved tentative allocation to the extent possible. Project leads and the Service's Representative will consider this recommendation and negotiate an agreement on any necessary adjustments to the tentative allocation of trumpeter swans for release. If project leads cannot reach agreement, then the priority for release of available swans will be based on the tentative allocation and project priority determined by order of project approval. If there is an excess of birds available for release relative to the tentative allocation, or birds become available from other sources, then additional swans will be made available based on any guidance in the Council's recommendation establishing the tentative allocation first, and then based on negotiations between the project leads and the Service's Representative while considering recommendations of the WWS. If project leads and the Service's Representative cannot reach agreement on allocation of the additional birds available for release, then each project will receive one swan in the order of project approval until the surplus is exhausted.

Periodically, the Council may reassess the progress and approval status of projects. To ensure that projects have a legitimate chance for success, it is not appropriate to change the approval status of a project unless results indicate there is little likelihood a project will be successful.

APPENDIX F. Pacific Flyway Council protocol and best management practices for release or transport of trumpeter swans.

Adopted by the Pacific Flyway Council March 15, 2016

Background

The Rocky Mountain Population (RMP) of trumpeter swans has been recovered from a few hundred swans in the early 1900s to about 17,178 swans in 2015, most of which breed in Canada. The US breeding segment population objective is 718 adults and subadults (165 nesting pairs) based on the Pacific Flyway Council's (Council) management plan (2012) for this population. The fall 2016 US breeding population size was estimated to be 731 swans.

One of the Council's management strategies is to release captive-reared swan cygnets or yearlings of RMP origin during summer into suitable habitats to establish new breeding flocks that winter outside the core Greater Yellowstone while maintaining connectivity to established flocks.

The Wyoming Wetlands Society is the primary source of RMP trumpeter swans for release in the Pacific Flyway, but swans have also come from the wild and other facilities including zoos and other organizations. The U.S. Fish and Wildlife Service has contributed funding annually in combination with contributions by the Wyoming Wetlands Society and others to produce RMP Trumpeter Swans (about 35–50 swans each year) for release in the Pacific Flyway. The Council approves and prioritizes release projects (sites). RMP Trumpeter Swans have been produced and released annually since the early 1990s.

The purpose of this document is to identify the protocol and best management practices for release to the wild (hereafter release) or interstate transport of captive-reared and wild trumpeter swans in the Pacific Flyway. The overall goal is to ensure that RMP Trumpeter Swan restoration efforts are successful in helping to establish new breeding flocks that winter outside the core Tri-state Area while maintaining connectivity to other flocks. Guidance in this document was developed in consultation with State and Federal veterinarians, the Wyoming Wetlands Society, and the Greater Yellowstone Trumpeter Swan Working Group.

General

Transport and release of trumpeter swans must comply with all State and Federal regulations, and may be more restrictive than the guidance provided in this document. This protocol applies to all facilities handling and providing Trumpeter swan for release within the Pacific Flyway. It is the responsibility of the state leads to ensure that all facilities are following State and Federal regulations.

Age at Release

Captive-reared trumpeter swans are generally released as hatchlings (by grafting to free-ranging pairs), cygnets, or yearlings. Swan cygnets are generally released at about 70–85 days of age, cygnets fledge at about 110 days of age.

Health Certification

Each trumpeter swan must receive a Certificate of Veterinary Inspection (health certificate) prior to release or interstate transport. A health certificate may be issued after visual or physical inspection of an animal, or after sampling an animal for disease testing. Disease testing is generally based on results from one set of samples from each animal.

The health certificate should be issued within two weeks prior to release or interstate transport, but could be up to 30 days consistent with health certificate guidance. A health certificate may not be required if a swan is hatched from a sterile incubator and immediately released post hatching, but check state and federal regulations. Sampling of hatchlings for health certification may be especially difficult and could reduce survival probability, but also may reduce options for grafting hatchlings to nesting adults.

The health status of each trumpeter swan could be determined via the following methods:

Blood samples
: Complete blood cell counts, serum chemistry analysis, and serological evaluation for exposure to infectious disease.

Swab samples
: Cloacal and oropharyngeal swabs for avian influenza testing.

Fecal samples
: Fecal flotation (microscopic examination of fecal material) for detection of eggs and larvae of gastrointestinal parasites such as *Giardia* spp., *Cryptosporidium* spp., roundworms, hookworms, and tapeworms.

Physical exam
: A formal examination of the bird for detection of nasal leeches, external parasites, infectious disease, injuries, general skin and feather health, poor growth, and general body condition.

At minimum, each trumpeter swan intended for release or interstate transport must be tested consistent with the two principal disease examination protocols including: 1) bacterial infections caused by *Salmonella spp.* (pullorum, typhoid) and *Mycoplasma spp*. (mycoplasmas, pneumonia), and 2) viral infections caused by highly pathogenic strains of avian influenza (H5 and H7). All testing must be in accordance with the National Poultry Improvement Plan (NPIP). Release or interstate transport of a Trumpeter Swan is not allowed if the swan tests positive for either of the two bacterial diseases or highly pathogenic avian influenza.

Trumpeter swans should be evaluated for other avian diseases and parasites including fungal infection caused by *Aspergillus spp.* (aspergillosis), bacterial infection caused by *Pasteurella spp.* (pasteurellosis), protozoan infection caused by *Plasmodium relictum* (avian malaria), and parasitic intestinal worm infection caused by Acanthocephala (acanthocephalans, thorny-headed worms, or spiny-headed worms) and Platyhelminthes (flatworms, flukes) as determined appropriate by the propagator and veterinarian.

Blood and other sample collection must be conducted by an experienced practitioner to obtain

appropriate samples and minimize swan handling time during processing. Following sampling, Trumpeter Swans must be held at a holding facility or the site of origin and kept from intermingling or sharing food and water resources with other untested swans while laboratory test results are pending and until the swans are released in the receiving state. If tested swans are allowed to intermingle or share resources, then the entire group of swans must be retested if a positive test result is returned for any swan in that group.

An import permit number issued by the importing state and the health certificate must accompany all trumpeter swans during interstate transport. Lab results should be attached to or accompany the health certificate during transit if not included on the health certificate. A copy of the health certificate, required test results, and import permit number must be provided to the appropriate representative of the wildlife agency in the receiving state.

Prior to trumpeter swan release or interstate transport, the appropriate representative (coordinator) of the importing state wildlife agency should contact the importing state wildlife agency veterinarian or agency-designated wildlife health representative and state veterinarian to determine if there are any relevant diseases of particular concern for wildlife or domestic birds in the importing state.

The weight and general appearance of each swan to be released should be evaluated at the time of release. Trumpeter swans of apparent poor health or weight should not be released at any location other than a treatment center or the site of origin.

Handling

Handling of trumpeter swans must be conducted by, or under the guidance of, an experienced practitioner to ensure swans are handled minimally, and that capture, holding, and relocation efforts are as efficient and humane as possible.

Crates and sacks used to hold or transport trumpeter swans should only be used for trumpeter swans. Crates and sacks must be disinfected between uses. Use a disinfectant such as Rocal or Virkon, which are commercially available disinfectant products, or chlorine bleach diluted to one part bleach to 10 parts water. Feed and water containers, and any other items the birds may contact, also must be disinfected following the same guidance for crates and sacks.

Veterinarians and other personnel working with swans should practice appropriate bio-security measures including wearing clean clothing and gloves when handling trumpeter swans, and avoiding contact with Trumpeter Swans within 48 hours of visiting an area with animals known or expected to be infected with any disease of concern. Handlers should avoid the transfer of infectious agents between other work or home areas and among captive swans, wild birds, and domestic birds including pet birds and poultry. Handlers must not have any immediate association with gallinaceous birds prior to handling swans including free-ranging and captive chickens, turkeys, quail, pheasants, and other such birds. Trumpeter swans should be sampled or examined at the site of origin and not at other areas (e.g., veterinary clinic, office, near poultry or other bird species, particularly gallinaceous birds) to decrease the risk of disease transmission.

Trumpeter swans that appear sick or injured before or during capture, handling, and transport

must not be released. In this case, a veterinarian should be consulted, an evaluation conducted based on clinical signs, and appropriate action undertaken, which may include treatment and release at site of origin, extended rehabilitation, release and monitoring, or euthanasia and complete diagnostic workup at a veterinary diagnostic laboratory. Swans with apparent myopathy at the release site may be released if the attending veterinarian, wildlife agency coordinator, and captive breeder judge that release of the swan provides the greatest probability of survival. Swans that have been held at a rehabilitation facility or veterinary clinic for examination, treatment, or rehabilitation may pose an increased risk of transmitting diseases if released into the wild. To minimize this risk, an evaluation of potential disease risk should be completed and swans should be evaluated and tested for diseases of concern prior to release. Appropriate actions should be undertaken for any swan that tests positive for a disease of concern including prophylactic treatment, release to a controlled environment, or release back to the site of origin.

Release Site

Areas intended for release of trumpeter swans should be monitored by local cooperators for waterfowl or other bird mortality events at least one month prior to and immediately after release of any trumpeter swan. If any bird mortalities are encountered, bird carcasses should be promptly submitted to a diagnostic laboratory. Diagnostic findings can be used to evaluate the disease risk to Trumpeter Swans and determine disease control activities.

Source Populations

Trumpeter swan source populations must have a health monitoring program to determine the health history of the source population and to assess the need for treatment of swans prior to movement. The program should use health certification results, laboratory tests, and necropsy information to evaluate long-term disease status of the source population. All wild and captive swans in an area have potentially been exposed to the same organisms; therefore, monitoring health parameters of subgroups of swans in an area over time can give an indication of their overall health history.

At least a subset of each captive trumpeter swan source population should be examined annually by a veterinarian in an ongoing effort to monitor population health. Examination may include visual or physical examination and sampling as determined appropriate by the veterinarian. Constraints associated with individual programs will help determine the intensity and feasibility of routine monitoring activities.

Source population areas should be managed to minimize the population's risk of excessive parasite loads and exposure to disease and contaminants where known or expected. Free-ranging birds, including wild swans, should be discouraged from intermingling with captive Trumpeter swans to minimize the risk of disease transmission between wild and captive swans. Food, water, and other resources for captive swans should be managed to minimize potential to attract other wildlife.

Mortality

Any trumpeter swan from the source population that dies, or any swan that dies during capture, handling, or within a relatively short period post-release, or any wild swan encountered dead, should be submitted within 24 hours of discovery to an appropriate state, federal or university diagnostic laboratory for necropsy and ancillary testing for cause of death determination. Any such mortality should be reported to the state wildlife agency veterinarian or agency-designated wildlife health representative in the source population state. Mortality caused by an infectious disease must be reported to the state wildlife agency veterinarian or agency-designated wildlife health representative and local wildlife supervisor in the captive source population state within 24 hours of discovery.

Record Keeping

Captive breeders should keep records on hatch dates and hatching percentage, genealogy (family history), health monitoring, disease testing, treatments, movement, and release of captive trumpeter swans to trace health risks and genetic diversity and relatedness of swans produced. All captive trumpeter swans must be individually marked so they can be traced to a specific nest, breeding pair, and rearing facility. The age of each swan at the time of release must be recorded. State coordinators should keep track of known mortality of released swans and probable cause where this information is available. Over time, age information can be used to evaluate probability of survival immediately post release given age and release type (grafting, cygnet, and yearling). These records should be available for review upon request by an appropriate representative of the importing agency or organization.

Every effort should be made to maximize the genetic diversity of the source population and released trumpeter swans to increase the likelihood of success for the captive release program.