PACIFIC FLYWAY COUNCIL

Management Plan: Western Population of Tundra Swans

Adopted August 2017

Cover photograph: Tundra swan, © 2016 Keith Kohl.

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

WESTERN POPULATION OF TUNDRA 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

Western Tundra Swan Subcommittee
of the
Pacific Flyway Study Committee

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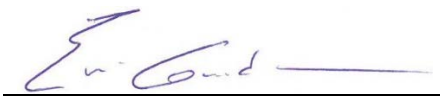
Approved by  October 16, 2017

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.

Management plans are developed by Council technical committees and include 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.

The first management plan for the Western population of tundra swans was adopted in March 1983. This document is the fourth revision of that plan. It was developed by the Western Tundra Swan Subcommittee of the Pacific Flyway Study Committee.

MANAGEMENT PLAN
FOR THE
WESTERN POPULATION OF TUNDRA SWANS

INTRODUCTION

Tundra swans (Cygnus columbianus) are managed as two populations in North America: Western Population (WP) and Eastern Population (EP). These populations are not different genetically, but are differentiated by their breeding areas, migration routes, and wintering areas. This plan provides guidelines for management of the WP swans. Management of the EP swans, which migrate from northern Alaska across all four waterfowl flyways, is treated in a separate continental plan (Ad Hoc Eastern Population Tundra Swan Committee 2007).

GOAL AND OBJECTIVES

The goal is to maintain WP swans to ensure long-term conservation, meet needs for consumptive and non-consumptive uses, and minimize depredation and nuisance concerns.

Objectives

1. Maintain a population of at least 60,000 WP swans as measured by the recent 3-year moving average of the breeding ground index (the combined Waterfowl Breeding Population and Habitat Survey [strata 8–11] and the Yukon-Kuskokwim Delta Coastal Zone Survey). Use of a Bayesian state-space model will be explored as an alternative to the 3-year average to better account for sampling variance.

2. Maintain suitable habitats in sufficient quantity and quality to support the population objective and current spatial distribution of WP swans.

3. Provide hunting opportunity for WP swans in the Pacific Flyway.

4. Provide for aesthetic, educational, and scientific uses.

STATUS

Distribution

Western Population swans breed in western Alaska and winter in California; EP swans breed in northern Alaska and winter on the east coast of the United States (Figure 1). Knowledge of WP swan migrations has improved substantially because of neck-collaring (Sladen 1973, Limpert et al. 1991, Moermond and Spindler 1997) and radio telemetry (Spindler and Hall 1991; Ely et al. 1997, 2014) studies, but descriptions of portions of their migration routes and staging areas remain incomplete. The Brooks Range in northern Alaska provides a barrier between EP and

WP swan populations within Alaska, but changes in tundra breeding and staging habitats may alter the distribution for both of these populations (Ely et al. 2014).

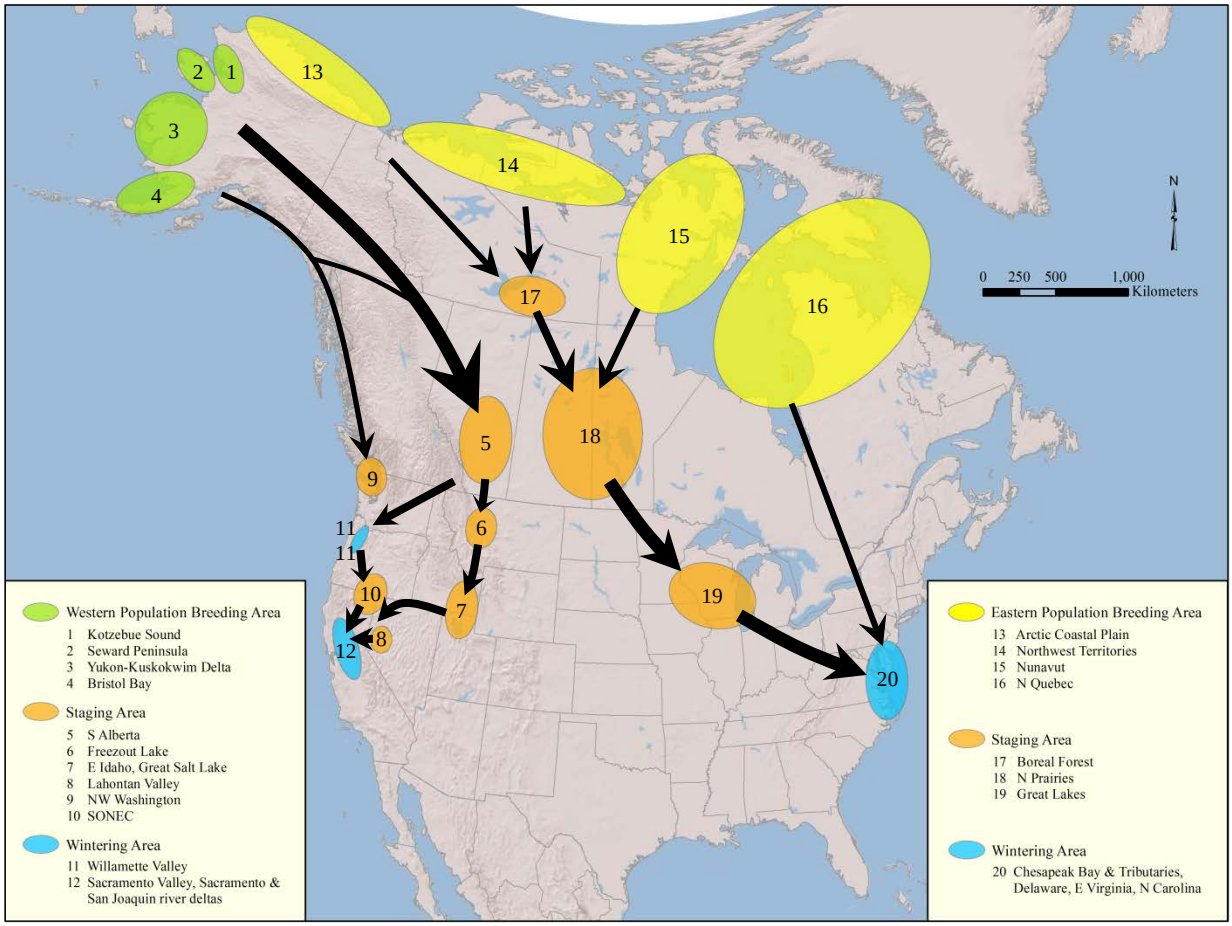

Figure 1. Range maps of Eastern and Western Populations of tundra swans in North America.

Habitat

Breeding Areas.—Tundra swans nest on lowlands along much of North America's subarctic and arctic coasts. Western Population swan individuals and family groups from northwest Alaska occasionally migrate with EP swans or change flyways (Jensen 1971, Sladen 1973, Limpert et al. 1991, Moermond and Spindler 1997). Swans breeding in western Alaska (from the Alaska Peninsula to Kotzebue Sound) are mostly WP swans, but a small proportion use EP wintering areas (Ely et al. 2014). The proportion of swans that use EP wintering areas (i.e., mixing) varies by breeding location, and ranges from 0-8%, with the highest rates of mixing in the Seward Peninsula and Kotzebue Sound regions (Ely et. al. 2014). Based on the 10-year average population index in each breeding area of western Alaska and the rate of mixing, we would expect about 3% (3500) of tundra swans in WP breeding areas (the combined Alaska breeding index) to migrate to EP wintering areas (USFWS unpublished data). The WP swan breeding range also includes Unimak Island in the easternmost Aleutian Islands, Kodiak Island, and the coast and islands of the eastern Bering Sea. Ely et al. (2014) estimated 4,000–4,600 tundra

swans inhabit the northern Alaska Peninsula. The majority of WP swans (76%) nest on the Yukon-Kuskokwim Delta (Ely et al. 2014).

Migration and Staging Areas.—Western Population swans migrating between Alaskan breeding grounds and wintering grounds further south in the Pacific Flyway use both interior and coastal routes. Most WP swans from western and northwestern Alaska use interior routes for migration; however, the remainder migrate primarily along the Pacific coast (Figure 1).

Western Population swans depart northwest Alaska breeding grounds in late September and move southeast up the Tanana River Valley (Spindler and Hall 1991, Moermond and Spindler 1997). Concurrently, some swans from the Yukon-Kuskokwim Delta stop briefly in Cook Inlet, then move east on an inland route north of the Wrangell Mountains, also to the Tanana Valley (Ely et al. 1997). WP swans cross into the Yukon during the first two weeks of October (Cooper and Ritchie 1988).

Coastal migrants, perhaps mostly from Bristol Bay and the Alaska Peninsula (Ely et al. 1997), travel through south-central Alaska; some stop briefly in Cook Inlet and the Copper River Delta. They fly into southeastern Alaska where they either follow coastal and or interior routes. The larger group probably continues eastward into Alberta where they're joined by other Alaskan swans that have migrated through the interior, and EP swans from the Arctic Coast and Mackenzie River drainage. The smaller of the two groups that split in southeastern Alaska follows a coastal route with flocks terminating their migration and wintering from British Columbia southward to California.

Western Population swans migrating from southern Alberta follow two primary corridors. One corridor leads to Freezout Lake, Montana, then southward to the marshes of northern Utah and northwestern Nevada. Peaks in fall migration occur in early November in Montana, mid-November in Utah, and mid to late December in Nevada (Ely et al. 2014). The migration is more protracted in Utah and Nevada than in Montana. Early freezing and storms usually decrease both the duration and magnitude of the migratory stopover in Montana; swans often overfly the state. Another more western route extends from southern Alberta across Idaho through Malheur Lake in Oregon, the Willamette Valley, and the Klamath Basin (SONEC) to the delta of the San Joaquin and Sacramento Rivers (Paullin and Kridler 1988). Swans migrating through interior British Columbia may also join this corridor in eastern Washington and Oregon.

In spring, fewer swans are believed to follow the coastal corridors than in fall. Departures from California may follow routes eastward through Utah and Montana, and northeast through eastern Oregon and Idaho (Paullin and Kridler 1988, Ely et al. 1997). Although some spring migrants have been observed in northeast Montana and Saskatchewan, most are believed to move into southwest Alberta, then northwest to the Mackenzie River drainage and the Northwest Territories, then westward along a broad front across the Yukon Territories to interior Alaska. The peak of spring migration into eastern Alaska (upper Tanana and Copper River drainages) is late April to the first week of May (Cooper and Ritchie 1988).

Wintering Areas.—A unique group of about 600 WP swans breeds at the southern end of the Alaska Peninsula and winters on Unimak Island and near Izembek Lagoon. Marked individuals

from this flock have been observed wintering in the traditional winter grounds of the flyway, but remain during other winters on this easternmost Aleutian Island (Dau and Sarvis 2002).

Survey data shows that some WP swans winter in coastal areas from Southeast Alaska to San Francisco Bay. In northern areas, WP swans usually winter with the Pacific Coast Population of trumpeter swans (Cygnus buccinator). About 300–500 swans winter along the southern British Columbia coast with most of the Pacific Coast trumpeter swans. Other notable wintering areas include about 5,000 swans in Washington, mostly in the Skagit River Delta; up to 10,000 swans in Oregon along the Columbia River from the Columbia Basin to the mouth and in the southwestern part of the state; and about 5,000 swans in Utah on the Great Salt Lake.

The primary winter terminus of WP swans is the Sacramento Valley and San Joaquin and Sacramento River Delta in California. Historically, swans used the Delta and moved to wetlands near the Delta during flooding events (M. Weaver, California Department of Fish and Wildlife, personal communication). However, since the mid- to late 1990s, swans have expanded into the Lower American Basin of the Sacramento Valley where flooded rice is abundant (California Department of Fish and Wildlife, Midwinter Waterfowl Survey data, unpublished). Swans are found at other locations throughout the Central Valley in winter and are less numerous in the southern portion of the state.

Western Population swans have wintered in all 12 Pacific Flyway states and in the province of British Columbia, but they are rarely reported in Mexico (Bartonek et al. 1981). Over the long-term, average winter distribution of WP swans occurs among nine Pacific Flyway states based on winter survey data (neither Alaska nor British Columbia are surveyed on a regular basis) has been: California 83%, Oregon 4%, Utah 7%, Washington 3%, and Nevada 2%. Idaho, western Montana, western Wyoming, and Arizona have occasionally recorded wintering swans (Olson 2016).

Variations in weather substantially affect the distribution of tundra swans during fall migration and winter. The abundance of fall and winter water in the west has a marked effect on annual distribution of tundra swans. The distribution of snow- and ice-free habitats also can significantly alter the phenology of migration and winter distribution of WP swans among Pacific Flyway states, particularly between Utah and California. During mild winters, Utah will harbor above-average numbers of swans (B. Stringham, Utah Division of Wildlife Resources, personal communication).

In the mid-1980s, a rapid water-level rise in the Great Salt Lake eliminated most marshes used by swans. This loss of habitat, combined with frequent severe winters during the same timeframe, resulted in record low numbers of swans in Utah until the mid-1990s (Table 1). During the same period, dry conditions in Nevada resulted in low numbers of wintering swans. Although California is the principal winter terminus for WP swans, the annual abundance of winter water has a strong influence on the distribution of swans. During dry winters, swans aggregate in large numbers on more permanent water bodies; during wet winters they are dispersed in smaller flocks.

Table 1. Age ratios and family group size of tundra swan flocks during October–January in northern Utah.

	Grouped birds			Family associations			Total		
Year	Adults	Juveniles	Percent young	Families	Young	Young/ family	Adults	Juveniles	Percent young
1963	1,397	527	27.4	99	218	2.2	1,595	745	31.8
1964	1,193	171	12.5	372	717	1.9	1,937	888	31.4
1965	883	541	38.0	141	362	2.6	1,165	903	43.7
1966	4,326	2,002	31.6	626	1,464	2.3	5,578	3,466	38.3
1967	4,753	3,975	45.5	595	1,722	2.9	5,943	5,697	48.9
1968	10,597	6,679	38.7	933	2,609	2.8	12,463	9,288	42.7
1969	19,527	15,414	44.1	637	2,031	3.2	20,801	17,445	45.6
1970	28,478	6,907	19.5	500	1,181	2.4	29,478	8,088	21.5
1971	5,465	1,422	20.6	516	1,165	2.3	6,497	2,587	28.5
1972	5,102	1,193	19.0	440	967	2.2	5,982	2,160	26.5
1973	3,696	2,105	36.3	670	1,549	2.3	5,036	3,654	42.0
1974	9,610	1,733	15.3	577	1,333	2.3	10,764	3,066	22.2
1975	2,443	163	6.3	218	539	2.5	2,879	702	19.6
1976	1,457	171	10.5	245	640	2.6	1,947	811	29.4
1977	2,960	123	4.0	459	1,091	2.4	3,878	1,214	23.8
1978	3,848	342	8.2	596	1,343	2.3	5,040	1,685	25.1
1979	7,210	2,198	23.4	960	2,456	2.6	9,130	4,654	33.8
1980	7,868	3,116	28.4	687	1,594	2.3	9,242	4,710	33.8
1981	11,636	3,917	25.2	1,246	2,635	2.1	14,128	6,552	31.7
1982	4,173	1,305	23.8	271	600	2.2	4,715	1,905	28.8
1983	12,456	6,373	33.8	774	2,229	2.9	14,004	8,602	38.1
1984	1,298	639	33.0	65	159	2.4	1,428	798	35.8
1985	670	276	29.2	77	173	2.2	824	449	35.3
1986	754	513	40.5	195	464	2.4	1,144	977	46.1
1987	402	224	35.8	68	175	2.6	538	399	42.6
1988	1,364	762	35.8	235	556	2.4	1,834	1,318	41.8
1989	1,263	696	35.5	144	352	2.4	1,551	1,048	40.3
1990	3,548	1,708	32.5	351	902	2.6	4,250	2,610	38.0
1991	2,286	1,176	34.0	232	594	2.6	2,750	1,770	39.2
1992	3,102	920	22.9	209	476	2.3	3,520	1,396	28.4
1993	1,809	630	25.8	180	449	2.5	2,169	1,079	33.2
1994	3,434	1,346	28.2	262	633	2.4	3,958	1,979	33.3
1995	5,655	2,178	27.8	783	1,777	2.3	7,221	3,955	35.4
1996	7,317	2,434	25.0	588	1,125	1.9	8,493	3,559	29.5
1997	108,626	22,934	17.4	855	2,034	2.4	110,336	24,968	18.5
1998	87,629	13,033	12.9	501	1,099	2.2	88,631	14,132	13.8
1999	67,388	10,481	13.5	603	1,333	2.2	68,594	11,814	14.7
2000	47,752	3,371	6.6	173	324	1.9	48,098	3,695	7.1
2001	26,836	2,012	7.0	80	162	2.0	26,996	2,174	7.5
2002	43,301	8,115	15.8	884	1,827	2.1	45,069	9,942	18.1
2003	18,103	5,485	23.2	207	533	2.6	18,517	6,018	24.5
2004	13,072	6,000	31.5	38	109	2.9	13,148	6,109	31.7
2005	5,198	2,544	32.9	420	868	2.1	6,038	3,412	36.1
2006	21,660	1,594	6.9	741	1,410	1.9	23,142	3,004	11.5
2007	16,324	1,170	6.7	684	1,062	1.6	17,692	2,232	11.2
2008	24,742	1,314	5.0	540	1,042	1.9	25,822	2,356	8.4
2009	19,767	3,022	13.3	279	618	2.2	19,767	3,640	13.3
2010	3,450	279	7.5	46	87	1.9	3,542	366	9.4
2011	11,782	1,280	9.8	147	272	1.9	12,076	1,552	11.4

Table 1. Continued.

	Grouped birds			Family associations			Total		
Year	Adults	Juveniles	Percent young	Families	Young	Young/ family	Adults	Juveniles	Percent young
2012	12,094	643	5.0	81	166	2.0	12,256	809	6.2
2013[1]	2,293	126	5.2	81	166	2.0	2,455	292	10.6
2014	2,413	387	15.5	235	488	2.1	2,413	875	28.7
2015	1,856	143	7.7	96	202	2.1	1,856	345	18.6

[1] Beginning in 2013, data were collected via aerial photography.

Life History

Since 1985, the nesting population size and potential productivity of tundra swans has been monitored using ground surveys of random plots on the coastal zone of the Yukon-Kuskokwim Delta (Fischer and Stehn 2015). Nest surveys indicate an increasing long-term (1985–2014) trend in the number of tundra swan nests (Fischer and Stehn 2015). For 2005–2014, estimates of swan nests expanded to the coastal zone averaged 12,152, with the highest number of nests in 2014 at 18,987. Clutch size of 427 nests during 1963–1979 averaged 4.3 eggs (Dau 1981). In the past 10 years, clutch size averaged 4.3 eggs (Fischer and Stehn 2015). The lowest average clutch size was 3.3 eggs in 1971 and the highest was 5.2 eggs in 1978.

Fall and winter age composition surveys were conducted in Utah until 2015 (Table 1) to annually monitor tundra swan productivity. The 1980–2015 average of 2.2 young/family in Utah suggests that summer-to-fall brood losses, including migration, are about 50% of clutch size. Bart et al. (1991) compared breeding ground brood sizes, age ratios during migration, and age ratios in winter for EP tundra swans. They estimated survival of young was 52% during their first migration to winter grounds and 76% thereafter during their first winter.

Harvest data collected during fall hunts suggest the proportion of young (gray) swans in the harvest has declined (Figure 2). This trend in age ratios may be expected for a species with high survival rates and delayed maturity where adults and subadults comprise a large percentage of a growing population. It also may indicate that density dependence is being expressed in declining rates of territory occupancy, productivity, or juvenile survival.

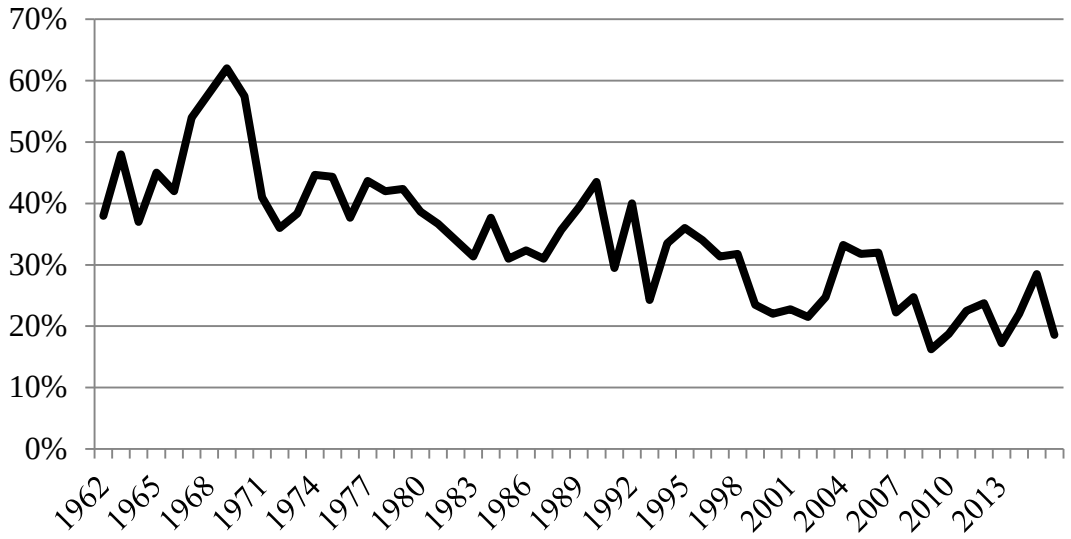

Figure 2. Percentage of juvenile tundra swans in the Pacific Flyway swan harvest, 1962–2015.

Population Demographics

The number of WP swans recorded during Pacific Flyway winter swan surveys has averaged about 62,000 swans over the long term (1955–2015) and 86,300 swans over the past 10 years. The population reached an all-time high of 122,521 swans in 1997 (Figure 3). The spring breeding survey generally follows the same trend as the winter survey. The spring waterfowl breeding surveys in Alaska (the combined index of the Waterfowl Breeding Population and Habitat Survey [strata 8-11] and Yukon-Kuskokwim Delta Coastal Zone Survey) has averaged 109,296 swans over the long term (1985–2016) and 123,426 swans over the past 10 years. The population reached an all-time high of 174,428 swans in 2008 (Table 2).

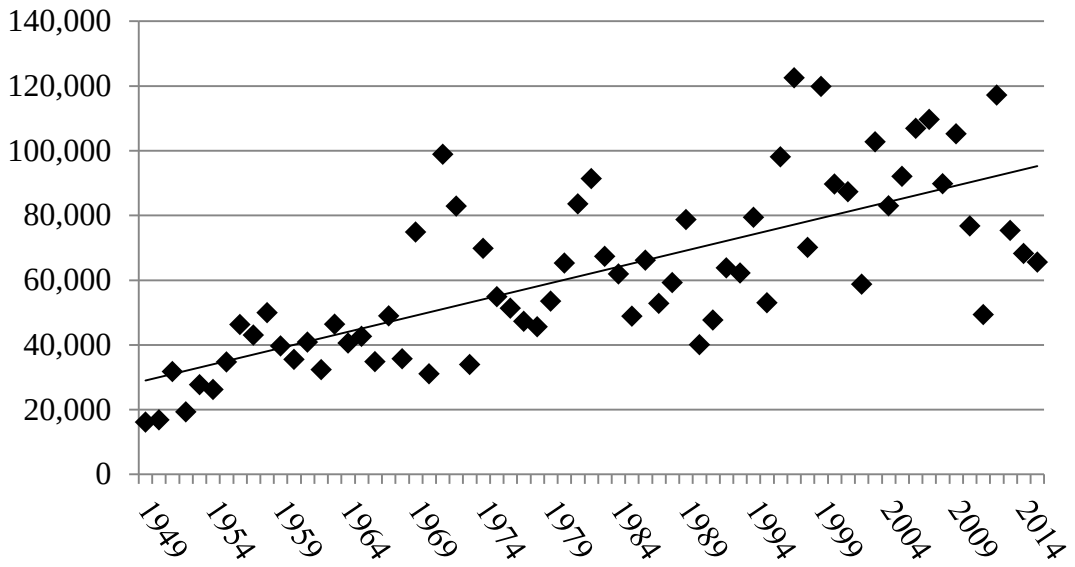

Figure 3. Winter population index of Western Population of tundra swans measured by Pacific Flyway Winter Tundra Swan Survey, 1949–2015.

Historically, EP swans have been more numerous than WP swans, and began to increase significantly in the mid-1970s. The EP grew by 55% between the mid-1950s and the late 1990s and peaked at over 120,600 in 2007. The EP has averaged about 103,400 swans over the past 10 years. Overall, the combined number of EP and WP swans has averaged 189,798 over the last 10 years and numbered over 228,000 tundra swans in 2012 (Figure 4).

Table 2. Indices of total birds[1] for Western Population of tundra swans in five areas of Alaska surveyed during waterfowl breeding population surveys, 1985–2016.

	Bristol Bay[2]		YKD Coastal[3]		YKD Inland[4]		Seward Peninsula[5]		Kotzebue Sound[6]		All areas			3-year
Year	Index	SE	Index	SE	Index	SE	Index	SE	Index	SE	Index	SE	CV	average[7]
1985	18,509	8,250	30,874	6,836	38,639	7,373	8,388	6,631	4,235	1,304	100,645	14,657	0.15	
1986	11,837	2,690	24,299	2,116	28,690	3,262	4,538	2,230	3,901	1,640	73,264	5,479	0.07	
1987	17,863	7,932	24,180	3,441	31,298	6,747	3,163	876	3,901	925	80,404	11,041	0.14	84,771
1988	9,470	1,722	24,459	3,724	44,725	13,356	3,163	1,243	2,564	1,004	84,379	14,063	0.17	79,349
1989	34,004	14,213	33,115	7,043	25,792	2,457	9,763	7,974	6,019	1,073	108,692	17,955	0.17	91,159
1990	9,685	2,059	30,006	4,741	44,338	6,999	7,288	5,140	23,518	17,544	114,834	20,247	0.18	102,635
1991	15,388	2,754	18,663	2,679	31,008	3,728	14,575	13,127	6,130	1,488	85,764	14,255	0.17	103,097
1992	15,603	3,133	19,411	2,179	28,303	2,437	4,538	419	5,684	1,683	73,539	4,849	0.07	91,379
1993	10,223	2,195	20,180	1,960	40,281	12,709	4,400	795	5,127	1,344	80,211	13,138	0.16	79,838
1994	10,115	2,461	18,787	1,716	46,367	6,427	3,988	2,342	4,793	1,652	84,049	7,650	0.09	79,267
1995	20,230	9,937	23,052	2,204	67,425	32,418	5,363	2,313	4,458	1,226	120,529	34,079	0.28	94,930
1996	13,666	2,730	23,121	1,651	61,243	18,793	6,463	1,510	6,130	1,664	110,623	19,194	0.17	105,067
1997	13,128	3,858	28,683	5,582	52,549	6,482	7,700	3,368	13,152	6,343	115,213	11,817	0.10	115,455
1998	13,882	3,453	33,355	5,666	53,225	6,888	8,663	6,096	17,722	8,298	126,846	14,053	0.11	117,561
1999	14,635	3,995	27,211	2,243	63,096	13,128	8,113	3,747	8,471	2,325	121,525	14,588	0.12	121,195
2000	16,249	3,838	28,306	2,992	48,521	9,682	7,288	2,811	10,143	4,606	110,506	12,105	0.11	119,626
2001	14,420	4,443	24,395	1,929	39,588	3,118	10,175	5,533	7,914	2,166	96,491	8,276	0.09	109,508
2002	17,755	6,158	31,193	4,790	49,932	11,949	8,113	2,516	11,926	4,277	118,919	15,109	0.13	108,639
2003	14,850	2,025	23,015	2,782	41,939	5,492	8,250	4,111	8,582	2,278	96,636	8,006	0.08	104,015
2004	13,236	4,315	27,099	2,523	51,718	18,589	8,800	3,709	11,703	4,660	112,556	20,150	0.18	109,370
2005	24,104	12,840	23,645	3,266	63,002	16,405	5,500	1,495	6,688	1,532	122,939	21,195	0.17	110,710
2006	17,755	4,513	31,545	3,124	62,532	11,460	4,125	1,044	8,694	2,786	124,651	13,051	0.10	120,049
2007	15,926	8,706	30,454	4,813	80,022	19,420	11,825	1,269	17,388	4,377	155,615	22,290	0.14	134,402
2008	12,805	4,762	32,184	4,439	86,511	26,692	7,150	3,181	35,778	16,039	174,428	31,973	0.18	151,565
2009	13,451	5,407	27,897	3,220	46,923	3,030	7,838	2,954	12,260	2,550	108,369	8,001	0.07	146,137
2010	8,286	1,527	37,790	4,667	44,854	3,993	10,725	6,359	9,920	1,715	111,575	9,134	0.08	131,457
2011	15,280	5,950	33,451	4,461	54,727	14,286	8,800	2,877	11,703	3,368	123,962	16,704	0.13	114,635
2012	10,223	851	39,291	5,822	48,709	6,999	7,425	2,583	9,697	1,324	115,345	9,593	0.08	116,960
2013	21,091	14,798	19,635	1,889	46,264	8,361	9,213	2,811	14,155	3,321	110,358	17,646	0.16	116,555
2014	14,635	5,376	27,413	4,085	31,783	3,289	6,875	4,290	8,471	3,173	89,177	9,213	0.10	104,960
2015	13,774	2,580	23,000	6,806	60,206	16,962	7,379	3,338	24,744	13,327	129,102	23,009	0.18	109,546
2016	11,191	2,116	31,251	5,939	54,163	20,490	8,800	3,197	10,923	2,467	116,328	21,815	0.19	111,536

[1] Index = singles + (2 x pairs) + birds in flocks.

Table 2. Continued.

[2] Waterfowl Breeding Population and Habitat Survey Stratum 8.
[3] Yukon Kuskokwim Delta Coastal Zone Survey.
[4] Waterfowl Breeding Population and Habitat Survey Stratum 9 inland portion.
[5] Waterfowl Breeding Population and Habitat Survey Stratum 10.
[6] Waterfowl Breeding Population and Habitat Survey Stratum 11.
[7] Recent 3-year moving average.

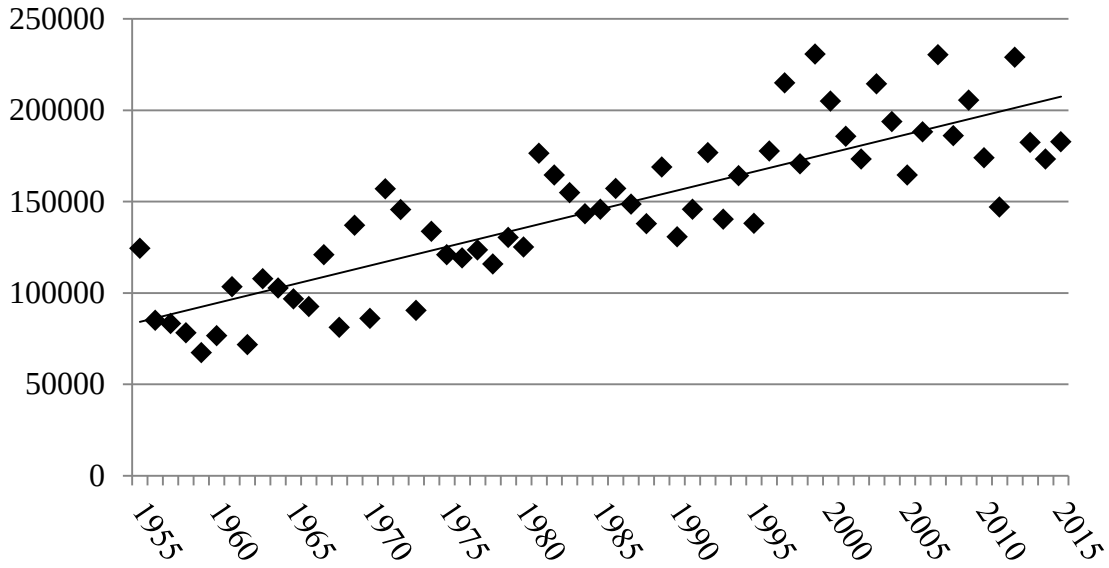

Figure 4. Winter population index of Eastern and Western Populations of tundra swans measured by Pacific Flyway and Atlantic Flyway Winter Tundra Swan Surveys, 1955–2015.

Public Uses

Consumptive Uses.—In the fall of 1962, Utah became the first state where tundra swans could be legally hunted since the enactment of the Migratory Bird Treaty Act in 1918. Swan hunting was first authorized in parts of Nevada in 1969, the Pacific Flyway portion of Montana in 1970, and Alaska in 1988. Nationwide, swan hunting has expanded with additional seasons for EP swans in the Central Flyway portion of Montana - 1983, North Carolina - 1984, North Dakota and Virginia - 1988, South Dakota - 1990, and a standing authorization for New Jersey.

For many years, Pacific Flyway states worked with the U.S. Fish and Wildlife Service (USFWS), The Trumpeter Swan Society, and other groups to: (1) manage for abundant and widely distributed WP swans in the Pacific Flyway, (2) maintain hunting opportunity for tundra swans, and (3) enhance the number and winter range distribution of Rocky Mountain Population of trumpeter swans. Minimizing the extent to which trumpeter swans are vulnerable to harvest is a central theme in trumpeter swan restoration and tundra swan hunting seasons (Appendices B and C). Since 1994, an average of 9.6 trumpeter swans have been harvested annually in the Pacific Flyway (Table 3).

Subsistence Harvest.—The Alaska Migratory Bird Co-management Council has conducted annual subsistence harvest surveys in Alaska since 2004 through their Harvest Assessment Program (AMBCC-HAP; Naves 2015). The AMBCC-HAP primarily reports harvest of WP swans in three regions of Alaska including Bristol Bay, Yukon-Kuskokwim Delta (YKD), and Bering Strait-Norton Sound, with the largest proportion of harvest consistently reported on the YKD region (Table 4; Naves 2015).

Table 3. Swan harvest, reporting statistics, and trumpeter swans detected in swan hunting seasons in the Pacific Flyway, 1994–2015.

	Tundra swan harvest			Swans examined			Reporting rate (%)			Trumpeter swans detected		
Year	Utah	Nevada	Montana	Utah	Nevada	Montana	Utah	Nevada	Montana	Utah	Nevada	Montana
1994	768	88	326	474	78	219	61.7	88.6	67.2	0	0	1
1995	348	72	182	244	66	110	70.1	91.7	60.4	3	0	3
1996	897	119	302	701	110	181	78.1	92.4	59.9	7	1	3
1997	704	131	300	497	116	217	70.6	88.5	72.3	3	0	1
1998	1142	185	276	879	156	168	77.0	84.3	60.9	1	0	3
1999	858	213	226	647	186	153	75.4	87.3	67.7	0	0	7
2000	550	78	217	454	65	203	82.5	83.3	93.5	1	0	3
2001	249	62	289	229	52	244	92.0	83.9	84.4	0	0	0
2002	518	45	167	453	40	141	87.5	88.9	84.4	2	0	3
2003	761	77	119	728	71	92	95.7	92.2	77.3	2	0	3
2004	612	82	254	570	77	203	93.1	93.9	79.9	2	0	6
2005	779	100	284	674	87	231	86.5	87.0	81.3	1	0	14
2006	814	155	169	712	147	135	87.5	94.8	79.9	2	1	7
2007	780	217	306	680	197	245	87.2	90.8	80.1	0	0	8
2008	651	136	200	557	120	175	85.6	88.2	87.5	1	0	1
2009	788	56	293	655	48	243	83.1	85.7	82.9	2	0	9
2010	699	118	208	693	111	173	99.1	94.1	83.2	0	0	10
2011	669	145	247	645	130	206	96.4	89.7	83.4	3	4	12
2012	873	203	293	854	194	235	97.8	95.6	80.2	2	0	30
2013	360	26	246	348	24	189	96.7	92.3	76.8	5	0	17
2014	726	25	167	699	24	144	96.3	92.3	86.2	2	0	12
2015	853	8	264	848	8	230	94.4	100.0	87.1	4	0	14
Total	15,399	2,308	5,335	13,241	2,075	4,137	86.3	89.8	78.0	43	6	167

Table 4. Alaskan subsistence harvest estimates of Western Population of tundra swans, 2004–2014. Data from Naves (2010 rev., 2011, 2012, 2014, 2015*a*, 2015*b*) and Naves and Braem (2014).

Region	Swan harvest										
Subregion	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aleutian Pribilof Islands		†[1]		†	0						
Aleutian-Pribilof Villages		7		0	0						
Unalaska											
Bristol Bay	†	536	†	272	92			210			
South Alaska Peninsula	0			0	0			0			
Southwest Bristol Bay	314	462	230	270	88			201			
Dillingham		43		2	4			9			
Yukon-Kuskokwim Delta	6,866	4,554	6,099	3,364[3]	3,851	5,065	4,511	3,139		†	
Y-K Delta South Coast	2,689	1,272	980	711	919	263	303	551		925	
Y-K Delta Mid Coast	780	249	1,442	90	783	1,730	559	264		814	
Y-K Delta North Coast	486	737	353	22	215	939	640			333	
Lower Yukon	536	1,151	1,525	498	272	647	630			822	
Lower Kuskokwim	1,172	713	1,388	1,747	1,474	1,323	2,337	1,632		769	
Central Kuskokwim	0		0	0			0				
Bethel	1,203	316	412	295[3]	105	52	42	25			
Bering Strait-Norton Sound	676	891		1,334		†	†	†	†		
St. Lawrence-Diomede Island	‡[2]	‡		‡		254	0	19	7		
Bering Strait Mainland Villages	‡	‡		‡			301				
Nome	‡	‡		‡							
Total	7,542	5,981	6,099	4,970	3,943	5,319	4,812	3,368	7	3,663	0

[1] Less than 75% of region households represented in sample, therefore regional harvest estimates were not produced.
[2] Harvest estimates produced only at regional level.
[3] 2007 Bethel harvest estimate does not include fall bird harvest.

Average annual bird harvest during 2004–2011 was 5,183 swans, with some regions not being consistently surveyed during that period (Table 4; Naves 2015). The average annual harvest of swan eggs during the same time period was 1,381 eggs, ranging from 682 to 2,607 (Naves 2015).

Nonconsumptive Uses.—Swans, being large, conspicuous, and long-lived, serve as ideal subjects for scientific investigations. In the 1970s, the nongovernmental Swan Research Group of the International Waterfowl Research Bureau fostered an international banding and marking program for swans that significantly influenced research and management of swans in North America and elsewhere. This work was extended by the Wildfowl Trust of North America (Grasonville, MD) and Environmental Studies at Airlie (Warrenton, VA). In addition, for many years, The Trumpeter Swan Society has produced and contributed to a wide variety of science, education, and management programs for both tundra and trumpeter swans.

Neck-collaring of both tundra and trumpeter swans has increased interest in swan viewing and photography among the general public. Some nonprofessional volunteers make significant numbers of sightings of marked swans, which contribute toward a better understanding of site fidelity, migration, and survival of swans. Swans also lend themselves to being the focal point of classroom studies on marsh ecology, migratory birds, and animal behavior. Recent satellite telemetry studies of EP and WP swans have peaked great interest in swan migration and ecology by the public and schools, especially through widely accessible Internet sites.

Management and Research

Western Population swans are inventoried twice annually; during winter and spring. The Pacific Flyway Winter Tundra Swan Survey is conducted in early December or January in portions of the Pacific Flyway. The winter WP swan count from each state is combined to give one population estimate for wintering WP swans in the Pacific Flyway (Figure 3). The spring counts include two annual aerial surveys flown by USFWS, Migratory Bird Management (Region 7) on WP swan breeding areas in Alaska: the Waterfowl Breeding Population and Habitat Survey (WBPHS) and the Yukon-Kuskokwim Delta Coastal Zone Survey (YKDCZS) of Geese, Swans, and Sandhill Cranes. The WBPHS is conducted in late May to early June within several WP tundra swan breeding areas, including Bristol Bay (stratum 8), YKD (stratum 9), Seward Peninsula (stratum 10), and Kotzebue Sound (stratum 11; Table 2, Appendix A). The YKDCZS is conducted in late May to mid-June within the YKD coastal zone, and overlaps spatially and temporally with the WBPHS (Groves 2016). Because the YKDCZS has broader coverage and a higher sampling intensity (i.e., more precise estimates) for the coastal zone of the YKD, its estimates are used in place of those from the WBPHS where they overlap (Groves 2016). The breeding ground index is the combined total bird indices from both the WBPHS (stratum 8, 9 [interior portion], 10, and 11) and the Yukon-Kuskokwim Delta Coastal Zone Survey. The management index is the 3-year average of the breeding ground index.

Additionally, measures of productivity are taken of nesting WP swans at selected sites on the Yukon-Kuskokwim Delta (Fischer and Stehn 2015), Izembek Lagoon, and at one time were done in Washington and Utah (Table 1). Information collected on harvest and hunter participation in Alaska, Montana, Utah, and Nevada is thorough and sufficient to document the effects of harvest and hunting regulations on population size.

No research topics have been identified for the population during the term of this plan. If research opportunities do arise, member agencies will seek opportunities with interested cooperators to develop relevant studies and identify sources of funding to accomplish the work.

MANAGEMENT ISSUES

1. Water scarcity in staging and wintering areas is a growing concern, specifically in California, Nevada, and Utah. Staging areas are producing less submergent vegetation, and if this trend continues, WP swans may alter migration routes. It also creates challenges to providing enough wintering habitat for swans in these areas which are also competing with other waterfowl species.

2. Regulation of the WP swan population may not be possible through current hunting levels in Alaska, Montana, Utah, and Nevada. This could become an issue if habitat damage occurs in staging and wintering areas as WP swans increase.

MANAGEMENT ACTIONS

Habitat Management

1. Habitat used by WP swans in the Pacific Flyway occurs largely within National Wildlife Refuges and state-managed wildlife areas, but there is substantial use of private agricultural land (predominantly flooded rice) in California's Central Valley. Managers are encouraged to continue to manage for waterfowl with consideration being given to swans and those other waterfowl species that are more dependent upon natural wetlands than agricultural areas.

   Priority: 1
   Responsibility: States, Provinces, USFWS, CWS
   Schedule: Ongoing

2. In areas of high swan concentrations, efforts should be made to avoid and minimize losses from collisions with towers, transmission lines, solar, and wind turbines. This should be accomplished through impact assessments of proposed utility and airport projects, informed land use planning, and appropriate regulatory measures in permitting processes.

   Priority: 2
   Responsibility: States, Provinces, USFWS, CWS
   Schedule: Ongoing

Population Survey

1. Monitor abundance of the WP swan breeding population via the Waterfowl Breeding Population and Habitat Survey and Yukon-Kuskokwim Delta Coastal Zone Survey.

   Priority: 1
   Responsibility: USFWS - Region 7
   Schedule: Ongoing

2. Monitor abundance and productivity of nesting WP swans on the Yukon-Kuskokwim Delta via the Nest Plot Survey.

   Priority: 2
   Responsibility: USFWS - Region 7
   Schedule: Ongoing

3. Monitor abundance of the WP swan wintering population via the Pacific Flyway Winter Tundra Swan Survey.

   Priority: 2
   Responsibility: States, USFWS
   Schedule: Ongoing

General Public Use

1. Provide an online hunter orientation course to assist hunters in distinguishing between tundra and trumpeter swans to reduce the accidental take of trumpeter swans during the hunt.

   Priority: 1
   Responsibility: UDWR, other States
   Schedule: Ongoing

2. Agencies and cooperators should develop opportunities to incorporate education about swans into interpretive facilities, school curriculum materials, hunter information products, and other public sources of information.

   Priority: 2
   Responsibility: States and Provinces, USFWS, CWS,
   The Trumpeter Swan Society, other NGOs
   Schedule: Ongoing

Harvest Management

1. Work with the Alaska Migratory Bird Co-Management Council to provide sustainable hunting opportunity for Alaska subsistence hunters during spring and summer and collect annual harvest information through the Subsistence Harvest Survey.

   Priority: 1
   Responsibility: AMBCC, PFC, USFWS
   Schedule: Ongoing

2. Work with the Alaska Migratory Bird Co-Management Council, USFWS, Pacific Flyway Council, and other conservation partners to provide sustainable hunting opportunity during fall and winter in the Pacific Flyway by implementing the following WP swan harvest.

   Priority: 1
   Responsibility: AMBCC, PFC, USFWS
   Schedule: Ongoing

Harvest Management Guidelines.—Western Population tundra swan seasons are closely managed through issuance of hunting permits, and will be adjusted accordingly to maintain WP swans at population objective levels and provide hunting opportunity. If the WP swan population drops below 60,000 birds, states with hunting seasons will take measures to reduce harvest.
There are many factors, other than biological capacity of the population, that constrain swan hunting in the Pacific Flyway, including the wishes of the public in individual jurisdictions, management of other waterfowl species, and efforts to maintain and restore trumpeter swan population segments (see Appendices B and C).

Western Population swan permits will be allocated among states to maintain traditional hunting opportunity and equitable distribution of harvest among participating jurisdictions. The Pacific Flyway Council will consider adjustments to current permit numbers, new hunts, and expansion of existing hunt areas on an as-needed basis to maintain the management plan goal and objectives.

a. Hunt Program Procedures

The following guidelines will apply to all states and provinces participating in a WP swan hunt.

1. Daily bag limits will be one swan; up to three swans per season may be allowed per hunter under single or sequential permits.

2. Swan hunting season dates must fall within duck or goose season framework dates for each state or province.

3. All swan hunters must possess a non-transferable permit issued by the state or province; fees may be charged at the discretion of the agency.

4. States will issue non-reusable tags to be validated by permittees and attached to the swan upon harvest.

b. Harvest Monitoring

Informational materials should be made available to hunters on swan management, occurrence of trumpeter swans in hunt areas, swan species identification, and swan harvest reporting requirements. The following are requirements for a state to hold a swan hunt in the Pacific Flyway.

1. All states, except Alaska, must implement a harvest monitoring program to measure

the species composition of the swan harvest. In Utah and Nevada, the monitoring program must require that all harvested swans or their species-determinant parts be examined by either state or federal biologists for the purpose of species classification. In Montana, the monitoring program must require either that all harvested swans or their species-determinant parts be examined by either state or federal biologists, or that hunters report bill measurement and color information, for the purpose of species classification.

2. All swan hunters must be required to report swan harvest to agency personnel within five days of the date of kill by methodologies developed by the administering agency.

3. All states, except Alaska, must use appropriate measures to maximize hunter compliance in providing bagged swans for examination or measurement and color information. States must achieve at least an 80% hunter compliance rate, or subsequent permits will be reduced by 10%.

4. After each hunting season, the state will provide the following swan hunting information to the Western Tundra Swan Subcommittee for compilation into an annual report: (a) number of applications received for permits, (b) number of permits issued, (c) percent of permittees that actively hunted, (d) estimated number of hunter-days afield, (e) estimated retrieved harvest, (f) estimated unretrieved kill, and (g) percent gray (immature) swans in the harvest.

5. Harvest trends will be included in the annual Western Tundra Swan Subcommittee reports and will identify season dates and lengths, numbers of permits, hunter activity, and swan harvest for each state conducting swan hunts. These can be found in the annual Pacific Flyway Recommendation and Informational Note packet.

c. Procedures for New Hunt Proposals

1. The USFWS completed a Final Environmental Assessment for general swan hunting seasons in the Pacific Flyway in 2003 (Appendix C), and at that time included the states of Montana, Utah, and Nevada (Alaska swan season is specifically tundra swans). Any other states wishing to have a swan season will require a revised Environmental Assessment for general swan hunting seasons in the Pacific Flyway. This will need to be completed prior to the Study Committee reviewing a new state hunt proposal.

2. Prior to requesting a new swan hunt, the state must submit a hunt plan proposal to the Study Committee at least 30 days prior to the Subcommittee meeting at which approval is sought. Hunt proposals must include: (a) description of hunt area boundaries; (b) a summary of numbers of swans, species composition, and seasonal use patterns in the proposed hunt area; (c) number of permits requested; (d) anticipated harvest; (e) season length and dates; (f) description of the permit process; and (g) proposed methods for obtaining reliable data on harvest and hunter activity.

3. States initiating first-time swan hunting seasons or proposing major changes in permits or hunt areas are encouraged to obtain adequate public participation before proposals are brought before the Pacific Flyway Study Committee and Council.

4. Swan hunting seasons should be directed toward tundra swans and designed to minimize take of trumpeter swans. As trumpeter and tundra swans become more abundant, and swan hunting becomes more popular and widespread, the chance taking of a trumpeter swan during general swan seasons could become more prevalent. To minimize this problem, waterfowl biologists, nongame biologists, and representatives from the USFWS and Pacific Flyway Council should work together in early planning stages of all proposed swan hunts and restoration projects. It is very important that all partners in swan management work together to minimize conflicts and find workable solutions that benefit both goals for trumpeter swan restoration and tundra swan hunting.

5. New hunts will be considered experimental for a period of three years, after which an evaluation to assess conflicts and address any take of trumpeter swans must be conducted before experimental seasons may become operational.

ANNUAL REVIEW

The Subcommittee shall meet at least annually or as needed to review progress toward achieving the goal and objectives of this plan and to recommend revisions. The Subcommittee shall report accomplishments and shortcomings of cooperative efforts to the Pacific Flyway Council through the Pacific Flyway Study Committee; to those state, provincial, and federal agencies having management responsibilities; and to agencies and organizations either interested or cooperating in the management of swans. In addition, the Subcommittee shall ensure its plans and activities are coordinated with those of other swan subcommittees.

Composition of the Subcommittee should be comprised of, but not limited to, representatives from those state, provincial, and federal agencies having management responsibility for this population. These member agencies are responsible for coordinating and integrating the objectives and procedures of this plan with resource and land management agencies, and public interest groups within their jurisdictions.

Chairmanship is rotated biannually among members, beginning January 1:

USFWS R-1	2018–2019
Nevada	2020–2021
Idaho	2022–2023
Utah	2024–2025
Montana	2026–2027

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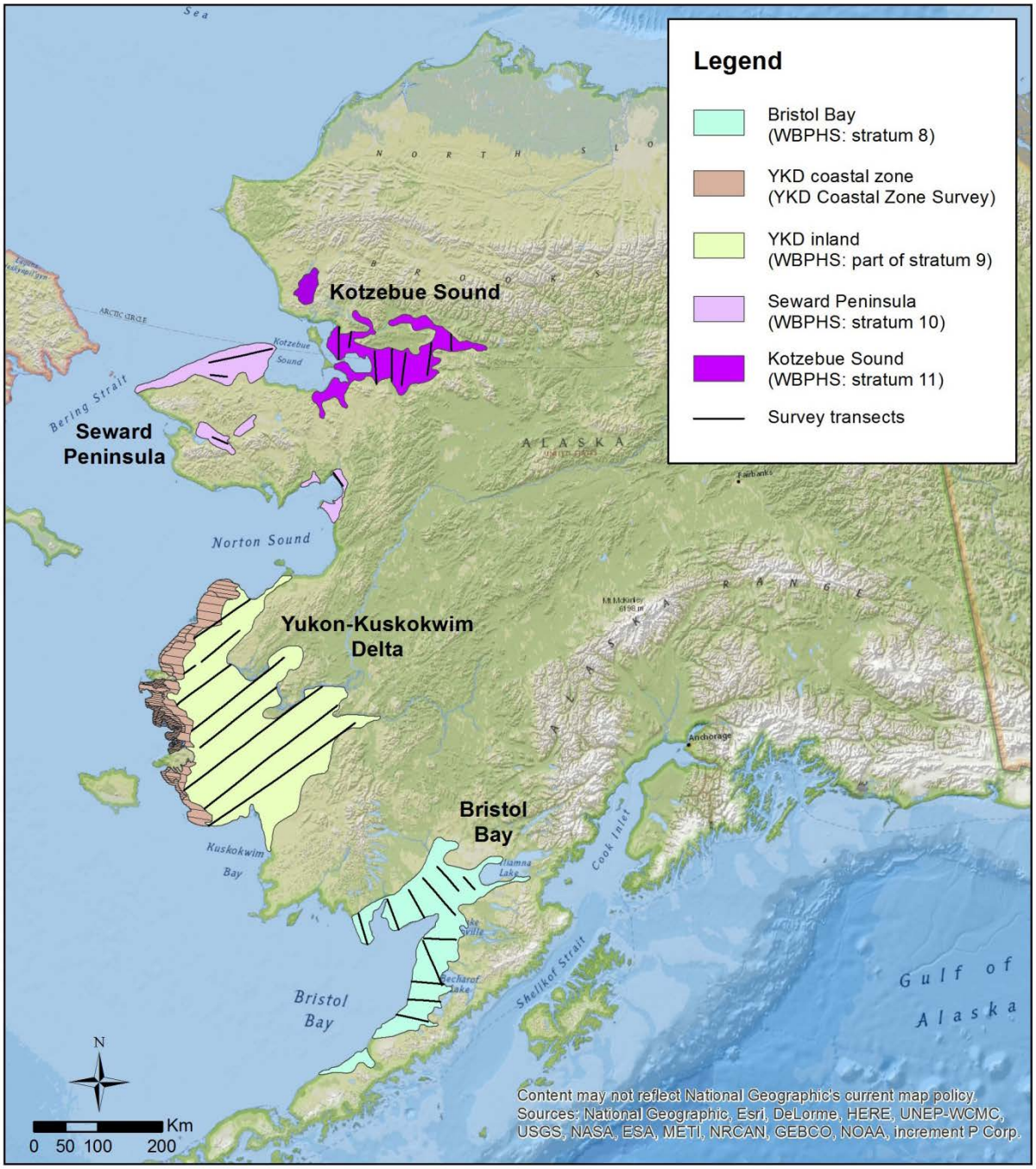
APPENDICES

APPENDIX A. Western Population of tundra swan survey areas for the combined Waterfowl Breeding Population and Habitat Survey and the Yukon-Kuskokwim Delta Coastal Zone Survey, 1985–present.



APPENDIX B. Swan hunting season frameworks designated in the Final Environmental Assessments in 1995 and 2000.

In August 1995, the USFWS issued a Finding of No Significant Impact with regard to the Environmental Assessment: Proposal to Establish General Swan Hunting Seasons in Parts of the Pacific Flyway for the 1995–1999 Seasons (Bartonek et al. 1995). Subsequent framework regulations established a 5-year experimental swan season in Montana, Utah, and Nevada with the following provisions:

1. HARVEST QUOTA: A fixed quota was set for the entire term of the 5-year experiment. A quota of 20 trumpeter swans was annually divided between Utah and Nevada (15 to Utah and 5 to Nevada); achievement of the quota would trigger closure of swan seasons. The quota level was subject to annual review, including the reported and estimated take of trumpeter swans. Montana was not subject to a quota.

2. DESIGNATED AREAS OPEN TO SWAN HUNTING: Montana – Hunting remained open in Cascade, Hill, Liberty, and Toole Counties; Chouteau County was added; and those portions of Pondera and Teton Counties lying west of U.S. 287-89 were closed. Utah – The area open to hunting was reduced to the Great Salt Lake Basin (those portions of Box Elder, Weber, Davis, Salt Lake, and Tooele counties lying south of State Hwy 30 and I-80/84, west of I-15, and north of I-80). No changes were implemented to hunt areas in Nevada.

3. SEASON DATES AND LENGTH: Montana – Season ending date not later than December 1. Utah – Season ending date not later than the first Sunday in December. Nevada – Season ending date not later than the first Sunday following January 1.

4. TERM PERIOD (5-Year Term): Swan harvests and monitoring programs were to be reviewed annually. In order to better evaluate the effects of the regulation packages on harvests of all swan species during potentially variable years, framework changes were to be minimal during a 5-year period, unless the USFWS deemed circumstances warranted change.

The 1995–1999 experimental swan hunt conditions required an evaluation of the results of the hunt. An evaluation report was completed in January 2000 (Trost et al. 2000). Primary conclusions by the USFWS were that continued swan hunting was justified in the Pacific Flyway because WP tundra swans are increasing and recent season frameworks did not present an impediment to growth and range expansion of RMP trumpeter swans.

In March 2000, the USFWS issued a draft Environmental Assessment that proposed to establish operational general swan hunting seasons in the Pacific Flyway and extensively sought comments from the public and public interest groups. A final Environmental Assessment was issued on 12 July and a Finding of No Significant Impact was issued on 23 July. The USFWS opted to continue swan hunting regulations similar to the 1995–1999 frameworks, with the following adjustments:

1. The area open to swan hunting in Utah was restricted to only that portion of the Salt

Lake Basin that was open during the 5-year experiment lying south of the northern boundary of the Bear River Migratory Bird Refuge.

2. The total number of tundra swan permits authorized for the State of Utah was reduced from 2,750 to 2,000.

3. The Trumpeter swan season closure quota for Utah was reduced from 15 to 10.

4. Season dates in Utah were extended one week (second Sunday in December) from frameworks in the 1995 Environmental Assessment.

5. Swan hunting seasons and conditions for Montana and Nevada during the 1995–1999 experimental period were made operational in 2000.

6. Nevada and Utah were required to employ physical examination of harvested swans in any authorized seasons. Montana may use either physical examination or the bill-card measurement system (Drewien et al. 1999) to monitor the species composition of their harvest.

7. The states were encouraged to achieve the highest possible hunter compliance with permit conditions. The USFWS indicated that they would reduce subsequent-year tundra swan permit allocations by 10% if harvest reporting rates are less than 80%. Permit allocations will be restored if reporting rates are restored to 80%. Quotas, where applicable, will be based on actual reported harvests, but season decisions will take into account non-compliance and wounding loss rates.

APPENDIX C. Swan hunting season frameworks designated in the Final Environmental Assessment in 2003.

On 5 August 2003, the USFWS issued Final Environmental Assessment: Proposal to Establish Operational General Swan Hunting Seasons in the Pacific Flyway (Bartonek et al. 1995), and a Finding of No Significant Impact on 25 August 2003. The preferred alternative was to allow a limited take of trumpeter swans during restructured swan hunting seasons. In general, the proposed action continues the reduction and alteration of areas open to swan hunting from the area that existed prior to the 1995 Environmental Assessment in Montana, Utah, and Nevada as described below.

Dates:

Montana	First Saturday in October to December 1
Utah	First Saturday in October to the second Sunday in December
Nevada	First Saturday in October to the Sunday following January 1

Open Areas:

Montana – All of Cascade, Chouteau, Hill, Liberty, and Toole counties and those portions of Pondera and Teton counties lying east of U.S. Highways 287 and 89.
Utah – Those portions of Box Elder, Weber, Davis, Salt Lake, and Tooele counties lying west of I-15, north of I-80, and south of a line beginning from the Forest Street exit to the Bear River Migratory Bird Refuge boundary to the westernmost boundary of the Refuge, then west along a line to Promontory Road, then north on Promontory Road to the intersection of SR-83, then north on SR-83 to I-84, then north and west on I-84 to State Hwy 30, then west on State Hwy 30 to the Nevada-Utah state line, then south on the Nevada-Utah state line to I-80.
Nevada – Churchill, Lyon, and Pershing counties.

Permits and Harvest Information:

Montana – 500 permits, with no established trumpeter swan harvest quota. Voluntary bill measurement card program will be maintained.
Utah – 2,000 permits, with a harvest quota of 10 trumpeter swans. If Utah reaches its quota, the season will be immediately closed. All harvested swans, or their species-determinant parts, must be examined by either state or federal personnel for the purpose of species classification.
Nevada – 650 permits, with a quota of 5 trumpeter swans. If Nevada reaches its quota, the season will be immediately closed. All harvested swans or their species-determinant parts must be examined by either state or federal personnel for the purpose of species classification. Persons hunting in Nevada may obtain up to two permits to hunt swans in an open season. The daily bag limit shall be one swan per day.

States are encouraged to achieve the highest possible hunter compliance with permit conditions. The USFWS intends to reduce subsequent-year tundra swan permit allocations by 10% if harvest reporting rates are less than 80%. Permit allocations will be restored if reporting rates are restored to 80%. Quotas, where applicable, will be based on actual reported harvests, but season decisions will take into account non-compliance and wounding loss rates.

The swan hunting season framework provides that the states of Utah, Nevada, and Montana must implement a harvest monitoring program to measure the species composition of the swan harvest. In Utah and Nevada, the harvest-monitoring program must require that all harvested swans or their species-determinant parts be examined by either state or federal biologists for the purpose of species classification. In Montana, hunters can report bill measurement and color information from harvested swans for the purpose of species classification. The states should use appropriate measures to maximize hunter compliance in providing bagged swans for examination or measurement and color information. The states of Montana, Nevada, and Utah must achieve at least an 80% hunter compliance rate, or subsequent permits will be reduced by 10%. All three states must provide to the USFWS by 30 June each year a report detailing harvest, hunter participation, reporting compliance, and monitoring of swan populations in the designated hunt areas.

Liberalization of Hunting Regulations:

Regulations for the general swan hunt will be no less restrictive than those described in the 2003 Final Environmental Assessment until the 3-year average number of trumpeter swans inventoried in the annual fall survey of the RMP U.S. breeding segment is >90% of the of the goal (614 adults) specified in the Pacific Flyway Council's Trumpeter Swan Implementation Plan. However, regulations may become more restrictive if evidence clearly suggests that the limits currently in place are negatively impacting the RMP or segments thereof. Status of the RMP and its segments will be reviewed annually and considered during the regulation-setting process.

In 2015, the 3-year average (2013–2015) number of trumpeter swans inventoried in the annual fall survey of the RMP U.S. breeding segment was 563 adult swans (2013 = 499, 2014 = 472, and 2015 = 718; USFWS 2017), and exceeded 90% of the 614 adult swan goal (553).