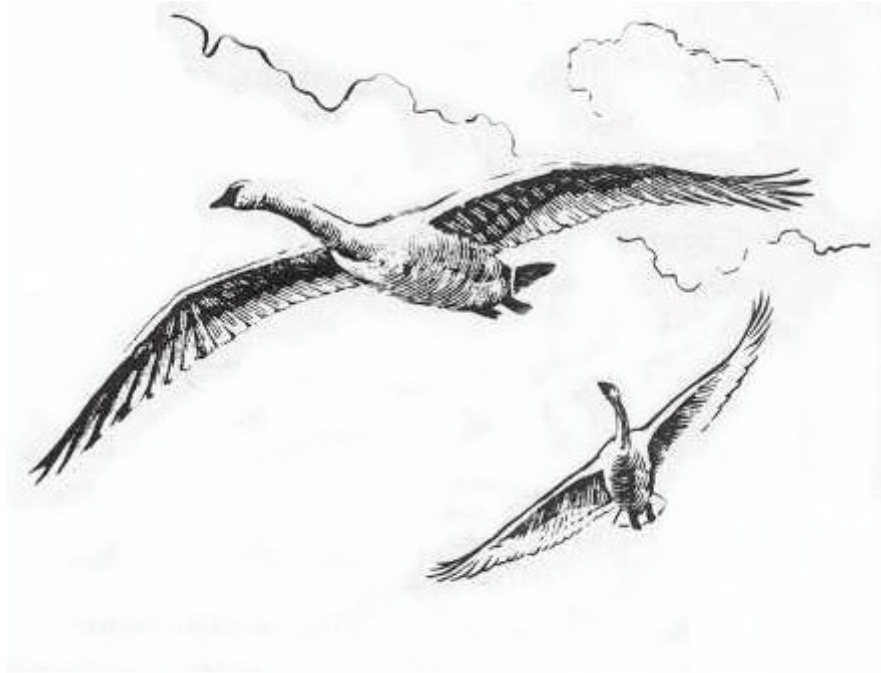


Pacific Population of Trumpeter Swans



PACIFIC FLYWAY MANAGEMENT PLAN
FOR THE
PACIFIC COAST POPULATION OF TRUMPETER SWANS

Prepared for the:

Pacific Flyway Council
U.S. Fish and Wildlife Service

Prepared by:

Subcommittee on Pacific Coast Trumpeter Swans
Pacific Flyway Study Committee

July 1984
Revised March 1993
Revised July 2006

Approved by:


Chairman, Pacific Flyway Council

3/31/08
Date

*Suggested Citation: Pacific Flyway Council. 2006.
Pacific Flyway management plan for the Pacific Coast Population of
Trumpeter Swans. Pacific Flyway Study Comm. [c/o USFWS, DMBM]
Portland, Oregon. Unpubl. rept.*

ACKNOWLEDGEMENTS

The Pacific Flyway Council appreciates the work of the PCP Trumpeter Swan Subcommittee to update and revise this management plan, and particularly personnel of the Region 7, Division of Migratory Bird Management in Anchorage who undertook the majority of the effort of managing reviews, re-writing and formatting several early drafts. Review and constructive comments from the The Trumpeter Swan Society are appreciated.

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I. INTRODUCTION

Trumpeter swans (*Cygnus buccinator*) in North America are divided into three populations for management purposes not based on biological differences. The three populations are: 1) Pacific Coast Population, 2) Rocky Mountain Population, and 3) Interior Population. The focus of this plan is on the Pacific Coast Population (hereafter PCP) of trumpeter swans (hereafter TRUS). TRUS nest primarily in Alaska, and less commonly in the Yukon Territory and northwest British Columbia. TRUS were once distributed across the continent from the Atlantic to the Pacific and were well known to early explorers (Fig. 1). Human exploitation removed TRUS from a significant portion of their original range. Records of TRUS in Alaska have been known since the early-1900s; however, actual numbers of swans remained unknown until 1955. This information provided the theretofore unknown source of TRUS wintering along the British Columbia coast (e.g., Munro 1949) and led to their 1968 removal from the list of “rare species” in the USFWS “Red Book”. In Canada, the species was designated of “Special Concern” in 1978, but was determined to be “not at risk” as of April 1996 by the Committee on the Status of Endangered Wildlife in Canada.

PCP TRUS have shown consistent increases since comprehensive breeding grounds surveys were begun in 1968 (Tables 1-2). An exhaustive census in 2005 of the Alaska nesting grounds detected 23,692 TRUS documenting the continuing increase since 1968 (Fig. 2). An additional 1,236 swans (SE = 61) were estimated from aerial surveys in Yukon Territory and British Columbia where TRUS have increased 18.5%/year since 1985 (Hawkings, pers comm.; Fig. 2). The PCP has increased with each survey since 1980 and has nearly met the goal of 25,000 swans (Tables 1-2, Figs. 2-3).

Some threats exist to Alaska breeding habitats, much of which is in productive lowlands attractive for recreation, farming, petroleum development, mining, and timber harvest. Swans have already been crowded out of some larger lakes that were productive in the past (Timm 1981) and surveys indicate impacts are greatest in developed areas (Conant et al. 2002). Harvest of TRUS in Alaska is currently illegal but the magnitude of illegal take is undetermined.

It is not assured that the PCP can continue to thrive throughout their breeding areas in the face of increasing human activity throughout their range, and in light of the increasingly important habitat constraints on the wintering grounds. Wintering habitats in Washington, Oregon, and British Columbia are being lost or fragmented by changing agricultural practices and urban/industrial development. In some wintering areas, swans are excluded from foraging areas due to concerns about agricultural crop depredation. This plan will guide management procedures necessary to conserve adequate breeding, migration and wintering habitats for the PCP while allowing for expansion to reach population goals.

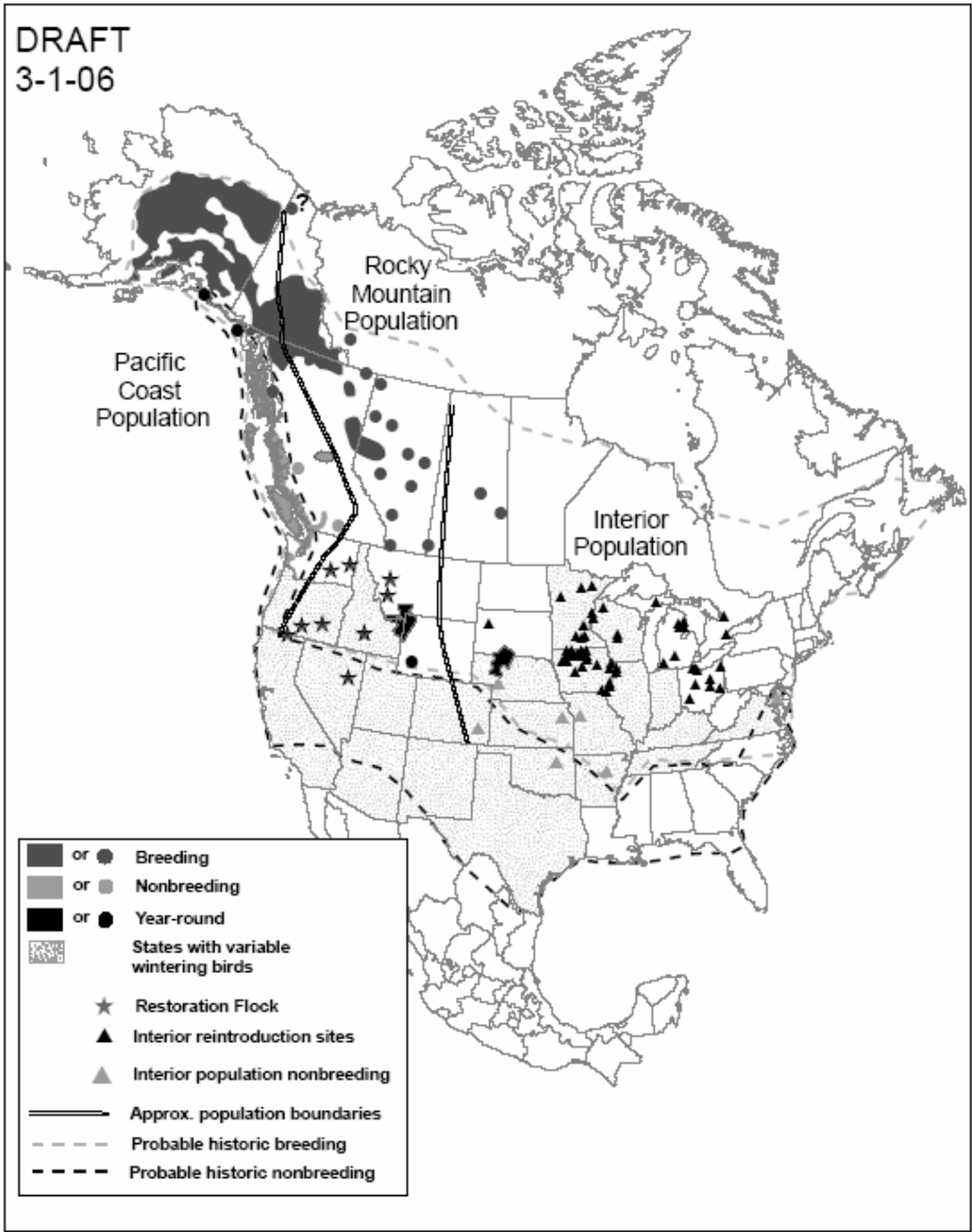


Figure 1. Present distribution of the Pacific Coast, Rocky Mountain, and Interior populations of trumpeter swans, and probable historic distribution.

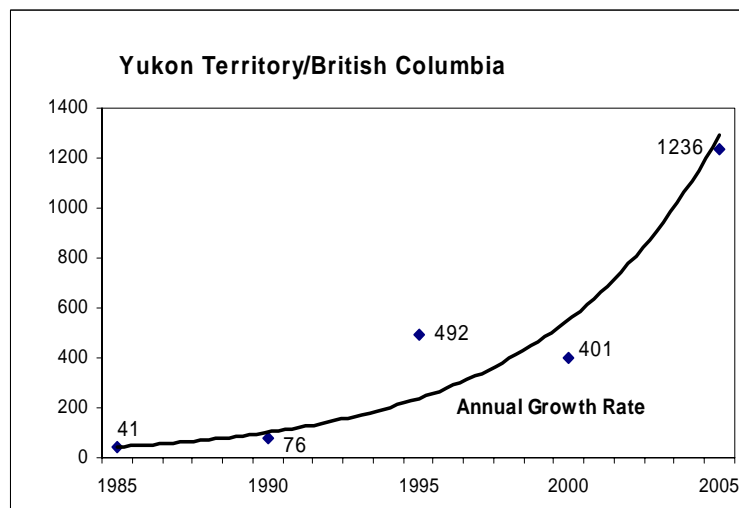
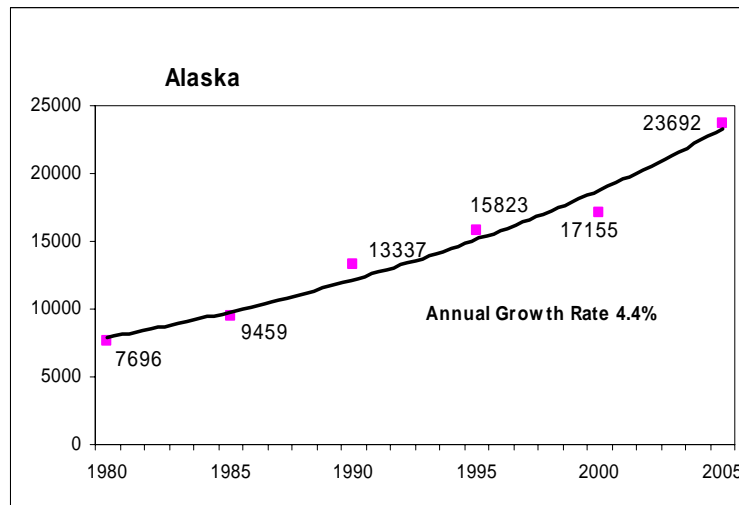
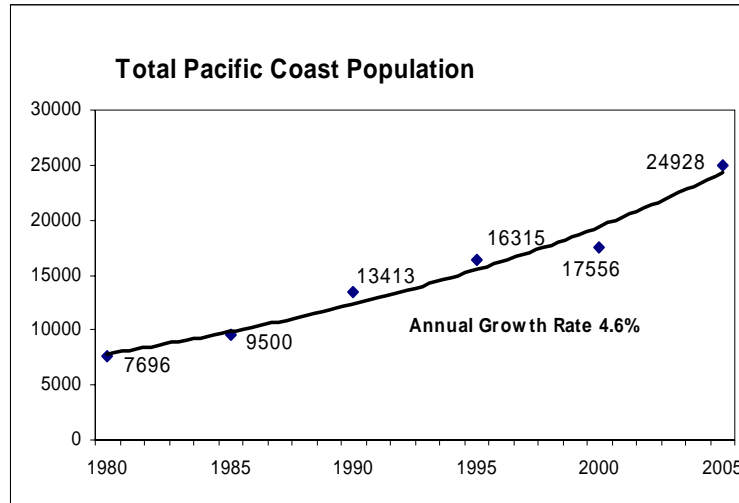


Figure 2. Trumpeter swan population trends for total PCP and by survey region. Data from aerial surveys during August-early September.

II. GOALS AND OBJECTIVES

The goal of this plan is to manage TRUS of the PCP numbers and distribution providing optimum benefits to society and for their intrinsic values.

Objectives of this plan are:

1. To allow the population to fluctuate naturally, but at not less than 25,000 swans as measured in late summer by the 5-year periodic PCP Breeding Trumpeter Swan Survey;
2. Identify and preserve nesting, migration, and wintering habitats in sufficient quantity and quality to meet population objectives;
3. Develop and implement interpretive and other educational programs that provide optimum recreational, viewing, and educational opportunities.

III. STATUS

Numbers and Distribution

Breeding Areas

TRUS of the PCP breed mainly in interior and coastal south-central Alaska with smaller numbers in the Yukon Territory and northwest British Columbia (Fig. 1).

TRUS were recognized in Alaska by early naturalists but they may have often been mistaken for tundra swans (Kessel and Gibson 1994). Monson (1956) recognized identification errors when he reported finding TRUS nesting in the Copper River system. Subsequent aerial investigations found them to be somewhat widespread throughout the boreal forests of Alaska (Hansen et al. 1971). The current primary range in Alaska includes Copper River Delta, Cook Inlet lowlands, Gulkana Basin, and Tanana River valley.

PCP TRUS nesting in the southern Yukon Territory and northwestern British Columbia appear to have arisen from an eastward expansion of the PCP from Alaska. Concurrently, there has been a westward expansion of the RMP from Alberta and the Northwest Territories into the southeastern Yukon Territory and northeastern British Columbia. As of 2005, it is possible there is some overlap between the breeding range of the PCP and RMP in the central Yukon Territory.

The PCP has been surveyed at five year intervals over most of their Alaskan and Canadian nesting range (Caithamer 2001). Surveys are conducted during late summer when all family groups are still on nesting grounds and the young are large enough to be counted from the air. Survey accuracy could be affected by overlap with tundra swans, incomplete survey coverage, and differential detectability in forested habitats. Surveys provide information on population size and distribution, as well as numbers reflecting both increases in the population density and breeding range expansion (Table 2, Fig. 4).

Winter

The PCP winters primarily in coastal and interior British Columbia (McKelvey 1981b, Hawkings et al. 2002) and western Washington (Mitchell 1994). TRUS winter between Cordova Alaska (Isleib 1981) and northwest Oregon (Cady, et al. 1981, 1982), and occasionally occur as far south as California (Grinnell, et al. 1918; Grinnell and Miller 1944) (Fig. 2; Table 4).

Swans in the conterminous United States are counted annually during the Midwinter Waterfowl Survey (MWS) in January (Hawkings 2002). In some wintering areas, special MWS emphasis is given to TRUS, but in other areas the MWS counts provide largely anecdotal records. Surveys in Washington and the British Columbia lower mainland indicate numbers have increased over the past 20 years (**Table ?**; Hawkings 2002). In British Columbia there are also records of swans wintering at Lonesome Lake since the early 1900s and numbers have increased dramatically on Vancouver Island since the 1970's (McKelvey 1981a and 1991, Hawkings et al. 2002).

Winter counts during 1990-91, supplemented by other estimates, only detected approximately 9,500 birds (Table 4), whereas during a comparable period, the summer breeding ground survey indicated about 13,500 birds (Conant et al. 2002; Hawkings, et al. 2002) (Tables 1-2) [**Update previous sentence using 2006 coordinated midwinter survey and 2005 breeding grounds survey**]. Possible explanations for the disparity between winter and summer estimates are: 1) important wintering areas may be missed by survey crews; 2) swans may shift to different wintering areas and go undetected in some years; 3) TRUS are undetected among concentrations of more numerous and widely distributed tundra swans; or 4) some misidentification may occur at Alaska sites where both swan species breed.

Migration

Numerous resightings and relocations of neck collared and transmittered TRUS have been collected (McKelvey and Burton 1983, King 1993, Lance and Mallek 2004) but no comprehensive analyses of PCP migration routes is available. Coastal and interior migration routes appear to be used between Alaska and the primary wintering sites in coastal British Columbia and Washington (McKelvey and Burton 1983, King 1993, Lance and Mallek 2004, Dallin 2004, Shea pers. comm.; Table 4). Perhaps half of the PCP passes through several heavily-used spring migration areas near Whitehorse, Yukon Territory, where intensive migration watches, ground counts, and monitoring for radio-collared swans has occurred during 2001-2005 (J. Hawkings, CWS, unpubl. data). The southeast Alaska and northern British

Columbia coasts are characterized by fjord-like inlets with limited migration or wintering habitats (Hawkings et al. 2002). Estuaries in southeast Alaska and northern British Columbia up to 150 miles inland from the main coastline are used extensively by spring migrants (McKelvey and Burton 1983, McKelvey, pers. comm.).

Uses and Management

PCP TRUS provide viewing, education, restoration, and scientific values. Hunting of RMP TRUS occurs incidental to general swan seasons in Montana, Utah, and Nevada, but is subject to harvest quotas (Trost et al. 2003). Hunting of PCP TRUS is prohibited under current regulations but some illegal shooting occurs.

Use of this population for restoration efforts has been permitted in recent years, as prescribed by the Council's guidelines for swan and egg translocation (Pacific Flyway Council 1999).

Alaska

Tundra and trumpeter swans historically have been harvested by subsistence hunters in Alaska. International treaty modifications in 2003 legalized and expanded subsistence use of migratory birds (Code of Federal Regulations 50, Part 92.32) but harvest of TRUS is not permitted. There are no estimates of incidental or illegal take in areas where tundra swans occur. Fall harvest of tundra swans, allowed by permit in western and northwestern Alaska, is authorized only in units where TRUS are currently uncommon.

TRUS habitats and populations in south-central Alaska are being adversely impacted from urban/industrial expansion, and increasing disturbance associated with recreation (e.g. cabins and vehicle use) (Timm 1981, Henson and Grant 1991). Disturbance due to anthropogenic factors is likely to increase in other TRUS habitats in Alaska, especially near cities, villages, and popular recreation areas.

Viewing and photographing of swans and making sightings of collared birds are increasingly important pastimes of persons in and near Petersburg, Anchorage, Yakutat, Cordova, and the Kenai Peninsula. Accessibility to other areas used by swans is more difficult and tends to restrict similar uses elsewhere (R.L. Delaney pers. communication). Aerial viewing and photography are not believed to be significant disturbance factors.

TRUS have been the subject of management and scientific research for over three decades (Hansen, et al. 1971, King 1981, Conant, et al. 1991) and population studies continue (Conant et al. 2002). Distribution and migratory behavior continue to be evaluated as well (Kessel and Gibson 1978 and 1994, King 1993, Lance and Mallek 2004).

Current management practices in Alaska include: (1) a range-wide aerial survey in August every five years performed by USFWS and cooperators; (2) local population monitoring and breeding ecology studies by USFWS-Fairbanks, staff of the Kenai, Koyukuk, and Tetlin NWRs, and the Chugach National Forest (CNF); (3) occasional banding and collaring by USFWS, Alaska Department of Fish and Game (ADFG), and US Forest Service.

During the 1980s, PCP swans became the source of eggs for several restoration programs in Minnesota, Michigan, Ohio, Wisconsin, and Iowa. Under Council guidelines, and in accordance with approved restoration plans, Alaska eggs were provided for both building captive propagation flocks or for release. Recipient jurisdictions were responsible for participating in egg collection as well as post-collection monitoring of the donor breeding pairs.

Yukon Territory

The spring viewing of TRUS is a popular local activity at important migration areas located at Tagish Narrows, Johnson's Crossing, M'Clintock Bay and Kluane Lake in southern Yukon. Each spring there is a month-long interpretive and educational program at the permanent viewing facility located at M'Clintock Bay on Marsh Lake. This viewing center (known as Swan Haven) and the associated interpretive program have been the flagship of the Yukon Government wildlife viewing program since the center was opened in 1994. The TRUS is possibly the best known "watchable wildlife" in the territory.

There is thought to be some aboriginal harvest of TRUS in the territory, but the numbers are probably very small. Early studies of TRUS in the Yukon Territory occurred from 1978-1986 as the RMP and PCP breeding ranges began to expand into the territory from the east and west, respectively (e.g. McKelvey et al. 1983). Most of the recent knowledge of this species in the territory comes from the coordinated aerial surveys conducted at 5-year intervals in the territory since 1985, ongoing counts of spring migrants at Swan Haven and other spring migration areas, and a small number of satellite-marked birds from 2002-2003 (McKelvey et al. 1983, Hawkings et al. 2002, Shea pers comm.) Various wetland inventories have also added to the knowledge of breeding and migration (Patton et al 2004).

Several important breeding and migration areas are currently protected or are slated for protection. The Nisutlin River Delta National Wildlife Area protects an important fall migration area, while critical spring migration areas at M'Clintock Bay and Tagish Narrows are designated as Special Management Areas in First Nation land claims agreements finalized in 2005. The Nordenskiold Wetland Habitat Protection Area protects important breeding areas along the Nordenskiold River south of Carmacks. Many other breeding areas are identified on a list of important wetlands for the Yukon Territory, and there are ongoing efforts to protect these by various means.

British Columbia

A large proportion of PCP TRUS winters on the southwest British Columbia coast. Swan viewing is an important recreational activity on the east coast of Vancouver Island and in the Fraser River delta during the winter, and takes place to a lesser extent in other wintering areas (e.g. Okanagan Valley, Kamloops and Prince George area). There is a limited use of PCP swans by First Nation groups, who use the feathers for ceremonial purposes.

The British Columbia PCP swans are primarily tracked through regular or periodic surveys of the wintering areas (e.g., Boyd and Breault 2004, Corbould 2001, Howie and Bison 2004, Innes 1994, McKelvey 1981a, 1981b, 1981c, McKelvey, et al 1991, Morrison 1988) and to a lesser

extent through breeding waterfowl surveys in northern British Columbia (Hawkings, et al. 2002, Breault, CWS unpubl. data). Swan mortality is tracked by the collection and autopsy of dead birds (Degernes, et al. 2004, Wilson, et al. 2004).

Over the years, PCP swans have been actively managed through the establishment of refuges, active feeding programs, support of land-based agriculture, or habitat purchases. The Canadian Government established two sanctuaries in British Columbia for TRUS during the 1920's. The sanctuary at Vaseux Lake near Penticton was used for several years by wintering swans until the flock was decimated by lead poisoning. The second sanctuary at Itatsso Lake on Vancouver Island was later abolished because it was ineffective in attracting swans (Mackay 1978).

Active feeding programs of wintering flocks were undertaken at five locations in British Columbia in the 1930's. Lonesome Lake was the only site where feeding occurred after the 1930's, but that program ended in 1988 (McKelvey, pers. communication).

Started in 1991, the Comox Valley Waterfowl Management Project on Vancouver Island provides ways for swans and farmers to coexist. The program encourages farmers to plant winter cover crops to improve soil conditions while providing forage for wintering swans. The cover crops serve to lure TRUS away from perennial grass fields. The project also provides a hazing program consisting of dogs, ultrasonic devices, flare guns, flash tape, pennant flags, barrels, and air horn to frighten swans away from protected fields. A similar initiative called the Greenfields Project was started in the Fraser River delta to provide funding to farmers to plant winter cover crops to improve soil conditions while providing forage for swans and other grazing waterfowl.

The Pacific Estuary Conservation Program (PECP) acts as the land acquisition arm of the Pacific Coast Joint Venture in British Columbia. The PECP has been very active in acquisition or management of prime estuary habitats used by wintering swans. Over its first 12 years of activities (1987-1999), the PECP acquired 1,612 hectares of private land on and around wetlands and arranged for the transfer and designation of 54,736 hectares of Crown lands for wildlife habitat in coastal British Columbia.

Washington

Bird watching is popular in Washington, and individuals and groups observe and photograph TRUS especially in the northern Puget Sound, Chehalis Valley, and Willapa Bay areas. TRUS are also a major attraction for natural history clubs, school, college groups, and 4-H clubs making educational tours of these areas.

Ongoing management activities in Washington include periodic winter surveys to document numbers, productivity, distribution, documentation of habitat use and documentation of changes in agricultural cropping patterns; participation in a project to determine the source of lead shot ingestion (Degernes, et al. 2004; Wilson, et al. 2004); development and management of a reserve for TRUS in the Skagit area; necropsies of swan mortalities (Degernes, et al. 2004; Wilson, et al. 2004); and participation in habitat presentation/enhancement activities of the Pacific Coast Joint Venture.

Oregon

PCP TRUS are generally observed in northwest Oregon, and have been reported at Tillamook Bay, the lower Columbia River below Bonneville Dam, the Willamette Valley, and at Sauvie Island near Portland (e.g., Cady, et al. 1981, 1982). At present TRUS in northwest Oregon are generally undetected because they are not readily differentiated from the more numerous tundra swans.

IV. MANAGEMENT ISSUES

There are three major management concerns for the PCP: (1) losses to lead poisoning; (2) habitat alteration; and (3) crop depredation.

Spent lead shot occurs in many wetland and adjacent upland habitats throughout the range of the PCP. Over 1,600 wintering TRUS are known to have died from lead poisoning in Washington and British Columbia, 1999-2005. Lead poisoning losses also occur in other areas throughout the range, but are generally at far lower levels than in the Washington and British Columbia coastal wintering areas. Addressing losses from lead poisoning in this area is the highest priority for management agencies to ensure the conservation of this population. Losses have been centered in the Abbotsford and Chilliwack area of British Columbia and nearby areas of Whatcom County, Washington during the winters of 1992 to 2004. An international task force involving Canadian and U.S. agencies and private groups was created in 2001 to identify the lead source(s). The swan deaths occurred over limited areas of British Columbia and Washington and swan telemetry and neck-collaring data collected since 2001 have further narrowed down the areas containing the possible point source(s) of lead. It is currently unclear whether the lead is from an old source or has been newly deposited. It is also unknown whether the shot sizes found in dead swans originate from waterfowl or upland game bird loads. In addition to lead poisoning, Aspergillosis and other forms of avian disease, illegal shooting, and power line collisions contribute to mortalities throughout the range of the population.

Specific habitat management problems of the PCP vary among the states, provinces, and territory, but all areas share the general issue of habitat losses and/or undesirable alterations of breeding, migration and wintering habitats. Conservation of habitat is necessary to maintain population management goals and ensure a sustainable population. Throughout breeding and spring migration areas, there are increased development pressures (home building, road building, power line construction, etc.) and human recreational activities (fishing, boating, etc.). In addition, habitats are subject to more subtle influences such as the impact of changing climate.

In Alaska, the widespread exploration and development of oil and gas reserves is of major environmental concern and consequence to swans (including a major proposal for oil and gas leasing in the Minto Lake breeding grounds). Coal development near Bering Lake and western Cook Inlet would also have impacts on swans. Increasing recreation and development activities on private lands will result in displacement of swans to less suitable areas. Intrusion into territories of swans and disturbance during summer by recreational users is a problem in parts of Alaska (Henson and Grant 1991; Timm 1981).

In the Yukon Territory and northern British Columbia, the breeding habitat (used and potential) for TRUS is virtually pristine. The most likely threats in the near future are forestry, mining, oil and gas, and hydro-electric development. There is considerable human activity at several of the most heavily-used spring migration areas. At M'Clintock Bay and Tagish Narrows, much of the waterfront is lined with private residences and cottages, many with docks. Specific concerns are: (1) the displacement of swans from preferred feeding and resting areas by boats, snow machines, ATVs, and human foot traffic, (2) infrastructure development (e.g. residences, power lines), and (3) habitat changes due to water level manipulation for hydroelectric power generation.

In the major wintering area of coastal British Columbia and Washington, habitats are being increasingly converted to crops not used by TRUS or are lost due to conversion to urban/industrial uses. Other management issues in British Columbia and Washington are fragmentation and disturbance of important estuarine and adjacent upland wintering habitats. Disturbance and habitat deterioration may be partially responsible for the changes in winter use patterns observed among TRUS. Agricultural lands support most of the PCP swans wintering in British Columbia and the viability of soil-based agriculture, changes in agricultural practices, and urban encroachment into agricultural lands are all a potential threats to current wintering areas.

Washington has seen a significant loss of agricultural (e.g. dairies) important to swans, and conversion/rotation of crops in existing agricultural areas to undesirable species for swans (e.g. cottonwood, raspberries). Residential developments placed in former agricultural areas are encroaching on critical resting and feeding areas used by swans. Bird watchers, photographers, and residents regularly force swans from preferred resting and feeding areas during critical winter periods.

Historically, the Comax Valley of British Columbia experienced significant agricultural depredation problems from wintering PCP TRUS. Management agencies and partners have been successful in reducing these concerns, but it is anticipated that similar situations will develop in other migration and wintering areas as this population continues to grow.

In Oregon, depredation by TRUS is currently not a major issue. However, increased problems may be perceived by landowners in the future as the population expands. This is extremely important in the Willamette Valley and lower Columbia River area where an expanding wintering Canada goose population is already creating numerous crop damage issues.

V. RECOMMENDED MANAGEMENT STRATEGIES

The degree and timing of the following management procedures and their implementation by the various lead agencies will be influenced by staffing levels, fiscal, and legislative constraints beyond the scope of this plan. Whenever possible, management procedures in this plan should be coordinated and incorporated into those recommended in plans for other species and populations of Pacific Flyway birds.

Range wide

- 1. Habitat Protection.** - - Identify, catalog, and make known the important habitats of swans for better maintenance and protection. Review project impact statements and land-use permit applications to ensure recognition and protection of swan habitats. Enter into cooperative agreements with other federal/state land-managing agencies and Native corporations to minimize impacts of development on swan habitats. Additionally, work in partnership with agricultural interests to maintain sufficient wintering habitat to the extent necessary to maintain the PCP goal.

Lead Agencies: USFWS, ADFG, WDFW, ODFW, CWS, YT, BC.
Participating: The Trumpeter Swan Society (TTSS), Washington Dairy Federation, DU(US), DU(Canada), Pacific Coast JV.
Priority: 1
Schedule: Ongoing

- 2. Trumpeter Swan Breeding Population Survey.** - - The summer survey of trumpeters which has been conducted in Alaska during 1968, 1975, 1980, 1985, 1990, 1995, 2000 and 2005 is the primary means by which the population objective is to be measured. In 1985 and 1990, the survey was expanded to BC and the Yukon Territory. Survey procedures should be standardized and a report produced.

Lead Agencies: USFWS, CWS, YT, BC
Participating: ADFG, NPS, BLM, USFS, TTSS
Priority: 1
Schedule: Ongoing – August, every fifth year, 2005, 2010, etc. Report to the Pacific Flyway Study Committee at the March meeting.

- 3. Swan Nest Mapping.** - - Spring surveys are needed to document nesting territories in areas experiencing development.

Lead Agencies:
Participating:
Priority:
Schedule:

- 4. Winter Trumpeter Swan Survey.** - - Winter inventories are required to determine winter distribution and to document range expansion. A simultaneous, range-wide inventory should be conducted every five years, following the summer survey. Follow-up ground surveys are needed in some areas of known overlap with TUSW to document species composition of swans seen on aerial surveys.

Lead Agencies: CWS, British Columbia, USFWS, WDFW, and ODFW
Participating: ADFG, and TTSS

Priority: 1
Schedule: Every fifth winter, January 2006, January 2011, etc. Report to Pacific Flyway Study Committee at the March meeting.

- 5. Compile and Report Population Delineation and Migration Data.** - - Results of various color-marking and telemetry projects should be synthesized and reported.

Lead Agencies: All participating agencies, TTSS
Participating:
Priority: 1
Schedule:

- 6. Interpretive Program.** - - Observing, photographing, and studying swans are important pastimes of people throughout the birds' range. Continuation and encouragement of these activities, where and when it will least affect the birds, and providing for an increased understanding of these swans and their relationship to waterfowl management and wetland conservation are recognized as integral parts of this plan. The PCP subcommittee will encourage and assist in developing 1) refuges or conservation areas for TRUS including viewing sites to allow access to swans without disturbance; 2) written and pictorial life history information on TRUS for dissemination to the public; and 3) electronic media programs that explain the nature and necessity for cooperative management of TRUS.

Lead Agencies: Subcommittee
Participating: USFWS, ADFG, WDFW, ODFW, BLM, TTSS, CWS, YT, BC
Priority: 3
Schedule: Ongoing

- 7. Restoration Flocks.** - - PCP swans could be made available for use in establishing and rejuvenating restoration flocks in states or provinces with approved restoration plans and with approval by the Flyway Councils. Use Pacific Flyway Council guidelines for the transfer of swans and eggs for restoration and research. Proposals approved by appropriate Flyway Councils must be submitted by January of the year prior to the planned removal of swans or eggs.

Lead Agencies: Subcommittee
Priority: 2
Schedule: Recommendations made annually by the subcommittee of the Pacific Flyway Study Committee at its March meeting.

- 8. Hunting Restrictions.** - - There is no hunting season for TRUS within the PCP range. However, there are no specific prohibitions for harvest by aboriginal hunters in Canada. Hunting of other waterfowl will not be precluded because of the chance-killing of TRUS.

Educational and increased enforcement efforts should be employed where TRUS are being shot. Specific conflicts between waterfowl species' population management objectives (including recreation and subsistence objectives) and strategies will be addressed and resolved by the subcommittee representatives in the state or states incurring the conflict(s). As the continental population of TRUS increases, consideration should be given to TRUS hunting seasons consistent with population-specific management plans and objectives. The subcommittee should begin evaluation of potential harvest regimes (initially focusing on traditional subsistence hunting) consistent with a secure population level, sustainable harvest, and public interests.

Lead Agencies: Subcommittee
Participating: AMBCC
Priority: 2
Schedule: As appropriate.

State/Province-Specific Actions

Alaska

- 1. Subsistence Harvest** - - Determine the magnitude of incidental and illegal shooting of TRUS and initiate enforcement and education programs to reduce or stop take.

Lead Agencies: USFWS, ADFG, AMBCC
Participating:
Priority: 2
Schedule:

Yukon Territory

- 1. Swan and Habitat Protection.** - - Swans in the Yukon need the following protections:
 - a. Develop and implement management plans for Special Management Areas created on critical spring migration areas at M'Clintock Bay and Tagish Narrows
 - b. Develop and implement management plans for Special Management Areas created on important breeding areas at Nordenskiold River, Horseshoe Slough, and Ddhow Ghrow
 - c. Seek special protection for important breeding areas at Nisutlin River, Pickhandle Lakes, and Scottie Creek
 - d. Seek protection for other TRUS habitat through land use planning, environmental assessment, and wetland policy development

Lead Agencies: CWS, Yukon
Participating
Priority: 1
Schedule: Ongoing

2. Habitat Requirements. - - Habitat requirements of swans in the Yukon should be assessed through the following actions:

- a. Determine adequacy of food resources at spring migration areas, especially for M'Clintock Bay and Tagish Narrows
- b. Monitor the numbers and phenology of swans using spring migration areas annually

Lead Agencies: CWS, Yukon
Participation:
Priority: 3
Schedule: Ongoing

3. Distribution and Migration. - - Distribution and migration of swans in the Yukon should be examined through the following efforts:

- a. Support banding/marking/telemetry/resighting programs that increase the knowledge of migration patterns and wintering/summering areas of TRUS likely to be affiliated with the Yukon Territory
- b. Conduct and/or coordinate the Yukon/northwestern BC portion of the 5-yearly range-wide survey

Lead Agencies: YT, CWS
Participating
Priority: 1
Schedule: Ongoing

British Columbia

1. Protection of Swans and Habitats. - - Wintering swans, particularly in the coastal portion of British Columbia, need protection from habitat degradation. Management actions include:

- a. Determine the winter range “carrying capacity” and develop regional population goals
- b. Establish recommended practices on lands and waters that would minimize adverse impacts to natural habitats

- c. Devise strategies to monitor and reduce conflicts with farmers over use of pastures by swans and to deal with crop depredations
- d. Evaluate land areas with significant upland grazing capabilities for swans and, if possible, acquire through fee title or easements

Lead Agencies: BC, CWS
 Participating: DU (Canada), TTSS
 Priority: 1
 Schedule: Ongoing

2. Monitoring and Investigations. - - The following monitoring programs and investigations are recommended:

- a. Continue to monitor lead shot ingestion and other mortality factors among wintering swans (CWS, BC; Priority 2; Ongoing)
- b. Continuing to compile reports of swans breeding within the Province (CWS; Priority 3, Ongoing)
- c. Determine if mute swans are adversely affecting wintering native swans and advise on appropriate measures (CWS; Priority 2; When practical)

Washington

1. Protection of Swans and Habitats. - - The following measures are recommended to improve protection to swans and their habitats:

- a. Initiate conservation actions necessary to secure and/or develop critical feeding sites and night roost areas. (WDFW; Priority 1; As practical)
- b. Maintain integrity of available swan habitats through environmental review of proposals for development (WDFW, USFWS; Priority 1; Ongoing)
- c. Eliminate or minimize human disturbance factors by regulations and education (WDFW; TTSS; Priority 2; As appropriate)

2. Monitoring and Investigations. - - The following monitoring and investigative efforts are recommended:

- a. Document habitat requirements and shifts in habitat use of wintering TRUS (WDFW; Priority 1; Ongoing)

- b. Determine the source of lead poisoning problems among wintering swans and develop mitigation strategies (WDFW, USFWS, TTSS, Audubon ; Priority 1; Ongoing)
- c. Assess mute swan populations and implement appropriate control methods (WDFW; Priority 2; Ongoing)

Oregon

1. Monitoring and Investigations. - - The following monitoring and investigative efforts are recommended:

- a. Assess mute swan populations and implement appropriate control methods (ODFW; Priority 2; Ongoing)

VI. ANNUAL REVIEW

The PCP Subcommittee should meet annually or as needed to review progress toward achieving the goal and objectives of this plan and to recommend revisions. The subcommittee should report on accomplishments and shortcomings of the cooperative management efforts to the Pacific Flyway Council (through the Pacific Flyway Study Committee), state and federal agencies having management responsibilities, and agencies and organizations cooperating in the management of swans. The PCP subcommittee should coordinate management activities with the RMP and Western Tundra Swan subcommittees and other flyways.

The PCP subcommittee should be comprised of representatives from those federal, state, provincial, and territorial agencies having management responsibility for this population i.e., AK, YK, BC, WA, OR, CWS, and USFWS. Participation of TTSS should be encouraged. It shall be the responsibility of 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 purview. Chairmanship shall be rotated biennially beginning October 1, among USFWS, CWS, OR, AK, and WA. The subcommittee will exercise the prerogative to invite to attend and participate at a meeting any individual, group, agency, or representative whose expertise and council is required for the coordination and implementation of management programs.

Lead Agency/Group: Subcommittee

Priority: 1

Meetings:

Schedule for rotation of chair:

2006 – AK

2008 – WA

2010 – R-7

2012 – OR

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Table 1. Population size and productivity of the Pacific Coast Population (PCP) of trumpeter swans, 1968-2005.

Survey Region	Year ¹							
	1968	1975	1980	1985	1990	1995	2000	2005
Alaska	2847 (32)	4170 (28)	7696 (32)	9459 (18)	13337 (27)	15823 (24)	17155 (19)	23692 (27)
Yukon Territory and NW British Columbia				41 (15)	76 (30)	492 (39)	401 (26)	1236 (30)
PCP Total	2847 (32)	4170 (28)	7696 (32)	9500(18)	13413 (27)	16315 (25)	17556 (19)	24928 (27)

¹ Estimated % cygnets in parentheses.

Table 2. Summary of the numbers of PCP trumpeter swans from censuses during August-early September by census unit in Alaska (1-11, Conant et al. 2006) and the Yukon Territory/northern British Columbia (12, Hawkings, et al. 2006).

	Year	Number of White Swans			Cygnets	Total
		In Pairs	As Singles	In Flocks		
1. Gulf Coast	1968	442	29	191	363	1025
	1975	442	32	190	193	857
	1980	586	52	266	351	1255
	1985	778	76	440	164	1458
	1990	666	59	205	434	1364
	1995	628	72	295	150	1145
	2000	754	58	230	314	1356
	2005	800	85	474	459	1818
2. Copper Canyon	1968	56	5	53	44	158
	1975	56	2	72	49	179
	1980	70	4	33	33	140
	1985	74	8	108	11	201
	1990	88	7	0	21	116
	1995	76	7	15	21	119
	2000	68	7	12	25	112
	2005	56	3	33	24	116
3. Gulkana	1968	288	31	81	190	590
	1975	556	43	155	284	1038
	1980	1026	42	632	660	2360
	1985	1736	143	595	533	3007
	1990	2142	225	776	778	3921
	1995	2332	280	965	1002	4579
	2000	2520	280	683	503	3986
	2005	2440	252	510	1228	4430
4. Kenai	1968	86	3	27	65	181
	1975	72	5	29	39	145
	1980	90	12	8	65	175
	1985	92	5	40	51	188
	1990	114	5	7	78	204
	1995	130	11	29	79	249
	2000	200	15	34	105	354
	2005	282	20	91	172	565
5. Cook Inlet	1968	224	19	50	124	417
	1975	340	36	60	181	617
	1980	608	38	186	369	1201
	1985	800	66	454	241	1561
	1990	904	79	162	516	1661
	1995	838	91	269	330	1528
	2000	938	57	219	331	1545
	2005	1470	196	310	694	2670
6. Lower Tanana	1968	224	21	94	137	476
	1975	518	21	185	388	1112
	1980	746	16	585	773	2120
	1985	1202	113	426	503	2244
	1990	2070	179	559	1072	3880
	1995	2268	219	987	1315	4789
	2000	2788	227	1026	901	4942
	2005	3054	305	1040	1786	6185

Table 2. Continued.

	Year	Number of White Swans			Cygnets	Total
		In Pairs	Singles	In Flocks		
7. Kuskokwim	1968					
	1975	20	6	4	7	37
	1980	60	0	22	63	145
	1985	122	0	62	55	239
	1990	386	21	141	233	781
	1995	454	42	134	248	878
	2000	662	40	177	226	1105
	2005	1016	69	338	535	1958
8. Koyukuk	1968					
	1975	94	6	45	35	180
	1980	124	4	27	104	259
	1985	206	23	29	45	303
	1990	366	40	86	133	625
	1995	524	56	158	228	966
	2000	772	80	162	248	1262
	2005	950	104	467	460	1981
9. Yukon Flats	1968					
	1975	2	0	0	1	3
	1980	2	0	0	4	6
	1985	10	0	0	3	13
	1990	66	8	22	56	152
	1995	200	26	107	90	423
	2000	412	35	173	129	749
	2005	632	40	374	324	1370
10. S.E. Mainland	1968					
	1975	2	0	0	0	2
	1980	6	0	3	11	20
	1985	16	1	7	16	40
	1990	34	1	23	50	108
	1995	58	2	18	61	139
	2000	64	4	24	70	162
	2005	76	10	56	70	212
11. Upper Tanana	1968					
	1975					
	1980	6	1	4	4	15
	1985	84	14	43	64	205
	1990	220	23	58	224	525
	1995	438	53	207	310	1008
	2000	808	96	309	369	1582
	2005	1164	73	455	695	2387
12. Yukon Territory/ N. British Columbia (Canada)	1985	9	3	23	6	41
	1990	30	8	15	23	76
	1995	187	16	99	190	492
	2000	179	20	99	103	401
	2005	566	40	261	369	1236
TOTALS	1968	1320	108	496	923	2847
	1975	2102	151	740	1177	4170
	1980	3324	169	1766	2437	7696
	1985	5129	452	2227	1692	9500
	1990	7086	655	2054	3618	13413
	1995	8133	875	3283	4024	16315
	2000	10165	919	3148	3324	17556
	2005	12506	1197	4409	6816	24928

Table 3. Trumpeter swan production measured from censuses during August-early September by census unit in Alaska (1-11, Conant et al. 2006) and the Yukon Territory/northern British Columbia (12, Hawkings, et al. 2006).

	Year	No. of Broods	Average Brood Size	Percent Juvenile	Percent Pairs with Broods
1. Gulf Coast	1968	93	3.9	35	41
	1975	61	3.2	23	27
	1980	99	3.6	28	33
	1985	57	2.9	11	14
	1990	125	3.5	32	37
	1995	57	2.6	13	18
	2000	99	3.2	23	25
	2005	141	3.3	25	35
2. Copper Canyon	1968	13	3.4	28	39
	1975	16	3.1	27	57
	1980	10	3.3	24	29
	1985	3	3.7	5	8
	1990	9	2.3	18	20
	1995	7	3.0	18	18
	2000	7	3.6	22	21
	2005	7	3.4	21	21
3. Gulkana	1968	52	3.7	32	36
	1975	93	3.1	27	33
	1980	194	3.4	28	36
	1985	191	2.8	18	22
	1990	276	2.8	20	25
	1995	310	3.2	22	26
	2000	187	2.7	13	14
	2005	393	3.1	28	31
4. Kenai	1968	21	3.1	36	49
	1975	15	2.6	27	42
	1980	19	3.4	37	42
	1985	16	3.2	27	35
	1990	23	3.4	38	40
	1995	29	2.7	32	42
	2000	35	3.0	30	34
	2005	52	3.3	30	36
5. Cook Inlet	1968	36	3.4	30	29
	1975	61	3.0	29	36
	1980	103	3.6	31	34
	1985	85	2.8	15	21
	1990	157	3.3	31	34
	1995	107	3.1	22	25
	2000	105	3.2	21	22
	2005	216	3.2	26	28
6. Lower Tanana	1968	42	3.3	29	33
	1975	112	3.5	35	42
	1980	202	8.0	36	54
	1985	179	2.8	22	29
	1990	336	3.2	28	32
	1995	426	3.1	27	37
	2000	340	2.7	18	24
	2005	607	2.9	29	39

Table 3. Continued.

	Year	No. of Broods	Average Brood Size	Percent Juvenile	Percent Pairs with Broods
7. Kuskokwim	1968				
	1975	3	2.3	19	30
	1980	16	3.9	43	53
	1985	18	3.1	23	30
	1990	68	3.4	30	34
	1995	71	3.5	28	30
	2000	81	2.8	20	24
	2005	186	2.9	27	35
8. Koyukuk	1968				
	1975	16	2.2	19	30
	1980	36	3.9	43	53
	1985	16	3.1	23	30
	1990	50	2.7	21	26
	1995	85	2.7	24	31
	2000	104	2.4	20	26
	2005	163	2.8	23	33
9. Yukon Flats	1968				
	1975	1	1.0	33	100
	1980	1	4.0	67	100
	1985	1	3.0	23	20
	1990	18	3.1	37	55
	1995	25	3.6	21	25
	2000	51	2.5	17	25
	2005	103	3.1	24	32
10. S.E. Mainland	1968				
	1975				
	1980	2	5.5	55	67
	1985	3	5.3	40	38
	1990	10	5.0	46	59
	1995	19	3.2	44	66
	2000	22	3.2	43	69
	2005	22	3.2	33	50
11. Upper Tanana	1968				
	1975				
	1980	1	4.0	27	33
	1985	19	3.4	31	45
	1990	53	4.2	43	48
	1995	82	3.8	31	37
	2000	118	3.1	23	28
	2005	194	3.6	29	33
12. Yukon Territory/ N. British Columbia (Canada)	1985	2	3.0	15	44
	1990	6	3.8	30	40
	1995	44	3.6	39	47
	2000	28	3.7	26	31
	2005	100	3.7	30	35
TOTAL	1968	257	3.6	32	37
	1975	378	3.1	28	35
	1980	683	3.6	32	40
	1985	590	2.9	18	23
	1990	1131	3.2	27	31
	1995	1262	3.2	25	30
	2000	1177	2.8	19	22
	2005	2184	3.1	27	34

Table 4. Winter distribution of the Pacific Coast population of trumpeter swans.

State/Province	Estimated # of Swans	Estimate or Winters of Count	Source
ALASKA			
Interior	A few	Estimate	Isleib 1981
Southcentral Coast	150 - 200	Estimated 10 - yr. avg.	Isleib 1981
Southeastern	600	Estimate	King 1981
BRITISH COLUMBIA			
Central Interior SW of Prince George	950 - 1,112	1970 - 71 Count	McKelvey 1991
	1,200	Estimate	McKelvey 1991
Mainland Coast - Queen Char. Is.	600	Estimate	McKelvey 1981
	692	1974 - 77 Count	McKelvey 1981
	1,500	Estimate	McKelvey 1991
Fraser Valley	100	Estimate	McKelvey 1981
	1,500	Estimate	McKelvey 1991
Vancouver Island	900	Estimate	McKelvey 1981
	3,000	Estimate	McKelvey 1991
Okanogan Valley	10	1977 - 78 Count	McKelvey 1981
	300	Estimate	McKelvey 1991
WASHINGTON			
Skagit Valley	284	1978 - 79 Count	Jeffrey, 1981
	294	1979 - 80 Count	Jeffrey, 1981
	436	1980 - 81 Count	M. Jordan
	405	1981 - 82 Count	M. Jordan
	395	1982 - 83 Count	M. Jordan, 1984
	566	1988 - 89 Count	M. Jordan, 1989
	700	1990 - 91 Count	M. Jordan, 1991
Other Washington areas	448 - 498	1982 - 83 Count	M. Jordan, 1984
	360	1988 - 89 Count	M. Jordan, 1989
	534	1990 - 91 Count	M. Jordan, 1991
OREGON			
Sauvie Island	10	1990 - 91 Count	M. Jordan, 1991
Willamette Valley	29	1990 - 91 Count	M. Jordan, 1991

Appendix 1. Historic and current research, inventory/monitoring and marking programs on PCP trumpeter swans.

	Year	Investigator	Title	Description	Status	Reports/Publications
RESEARCH						
Example	1962	Shepherd, P.E.K.	An ecological reconnaissance of the trumpeter swan in southcentral Alaska.	Breeding biology, distribution, abundance, habitat.	Completed	MSc thesis Univ. Wash.
INVENTORY/MONITORING						
MARKING						

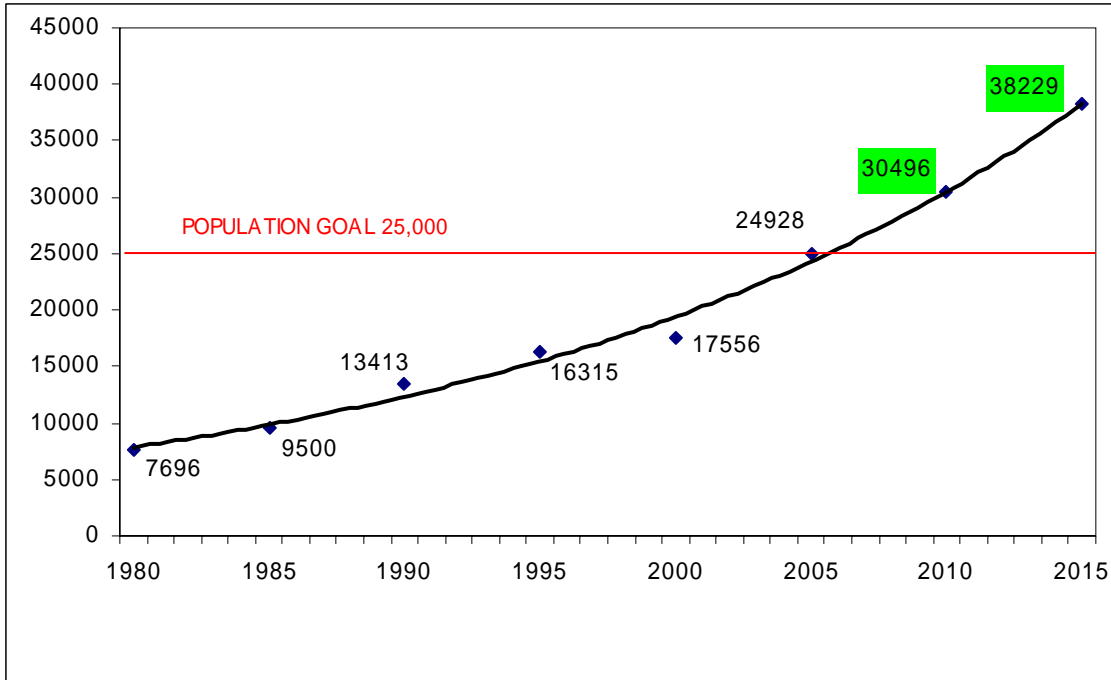


Figure 3. Potential PCP Growth Assuming 1980-2005 Growth Rate (4.6%/Yr) Constant from 2005-2015.

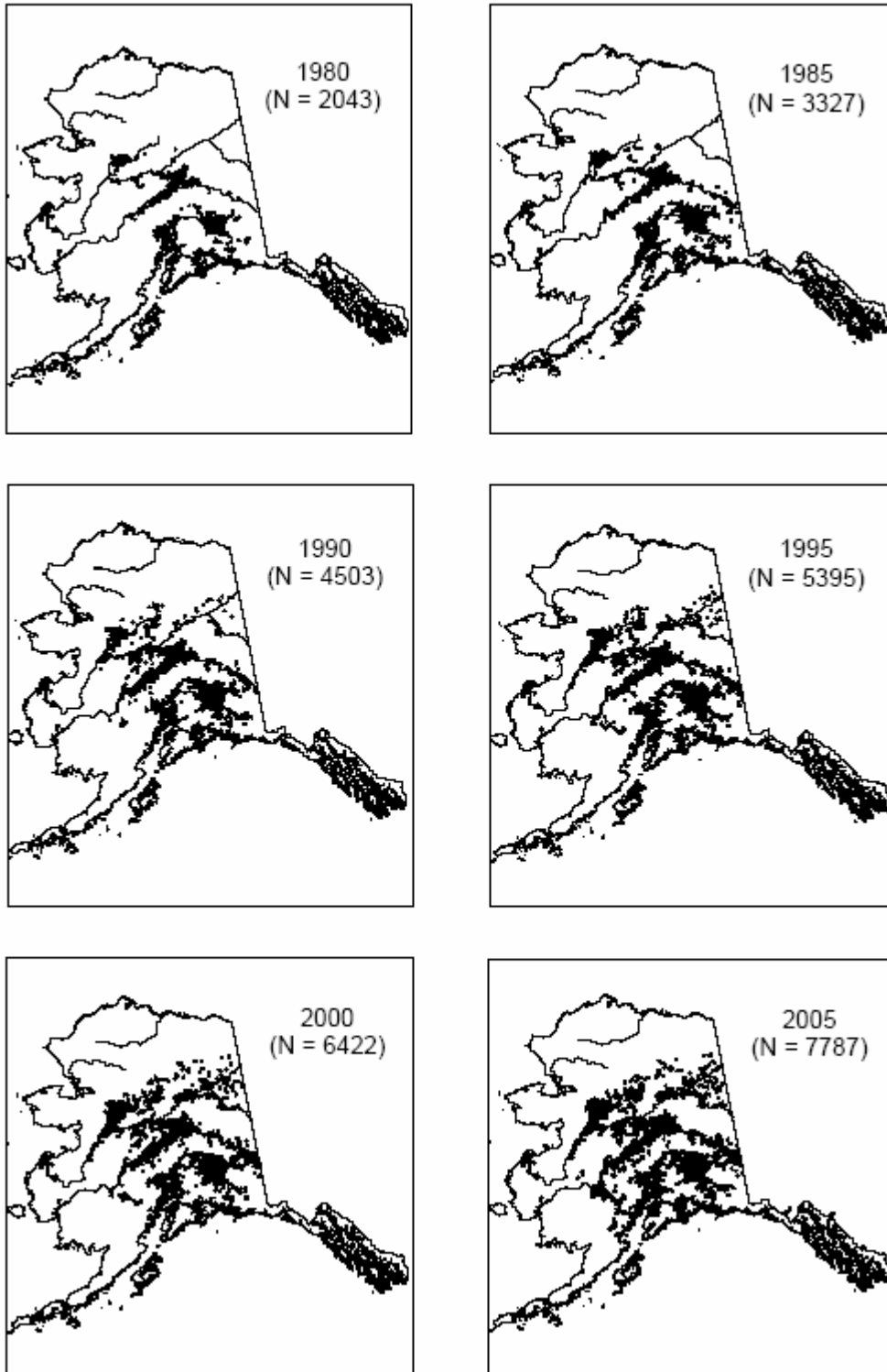


Figure 4. Individual observations of trumpeter swans during summer in Alaska, 1980-2005.