Aleutian Canada Geese
PACIFIC FLYWAY MANAGEMENT PLAN

FOR THE

ALEUTIAN CANADA GOOSE

Prepared for the

Pacific Flyway Council
U.S. Fish and Wildlife Service

by the

Subcommittee on the Aleutian Canada Goose
Pacific Flyway Study Committee

Approved by: ________________________________   ________
Chair, Pacific Flyway Council                Date

July 30, 1999

TABLE OF CONTENTS

TABLE OF CONTENTS .................................................. i
LIST OF FIGURES .................................................. ii
LIST OF APPENDICES ............................................... iii
I. INTRODUCTION .................................................. 1
   Description ....................................................... 1
II. GOALS AND OBJECTIVES ..................................... 3
III. STATUS AND DISTRIBUTION ................................ 4
   Historical Range and Abundance .............................. 4
   Reason for Decline .............................................. 5
   Recovery Efforts ................................................ 5
   Restoration Efforts on Breeding Grounds ................... 5
   Restoration Efforts on Migration and Wintering Areas ... 6
   Population studies and monitoring ......................... 6
   Hunting Closures .............................................. 9
   Habitat Protection and Management ....................... 9
   Present Status and Distribution ............................ 10
   Breeding Range ................................................ 10
   Migration and Wintering Range ............................. 11
IV. PUBLIC USE .................................................... 12
V. CURRENT MANAGEMENT PRACTICES ....................... 12
   Breeding ....................................................... 12
   Migration ..................................................... 13
V. PROBLEMS ...................................................... 14
VI. RECOMMENDED MANAGEMENT ACTIONS .................. 14
VII. LITERATURE CITED ........................................... 20
LIST OF FIGURES

Figure 1. Map of Aleutian Islands. .................................................. 2
Figure 2. Wintering areas and hunting closure zones in California. ............... 7
Figure 3. Wintering areas and hunting closure zones in Oregon. ................. 8
LIST OF APPENDICES

Appendix 1. Population size of Aleutian Canada geese in California, 1974-1998. . . . 23
Appendix 2. Summary of translocations. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 24
Appendix 3. Nesting populations in the Aleutian Islands . . . . . . . . . . . . . . . . . . . . . . . 26
I. INTRODUCTION

This plan establishes guidelines for the cooperative management of Aleutian Canada geese (*Branta canadensis leucopareia*) in the Pacific Flyway. Currently listed as "threatened" under the Endangered Species Act, the goose has increased both in overall numbers and breeding distribution. The subspecies was proposed for removal from the special protection of the Endangered Species Act in 1999 (Federal Register, August 3, 1999, Vol. 64, pp 42058-42068). This plan was formulated on the basis of the Recovery Plan (Byrd et al 1991) and U.S. Fish and Wildlife Service (Service) notices and proposed rules published in the Federal Register.

The Aleutian Canada goose was historically thought to have bred from near Kodiak Island, Alaska, to the Kuril Islands in Asia (Figure 1), and wintered in Japan and from British Columbia to northern Mexico (Delacour 1954). This goose population declined precipitously in the early 1900s primarily as the result of the introduction of Arctic (*Alopex lagopus*) and red (*Vulpes vulpes*) foxes to its nesting islands. The Aleutian Canada goose was listed as endangered in 1967 and a formal recovery program began in 1974. At the beginning of the recovery program the population numbered about 800 birds, and by 1990 the Aleutian Canada goose population had increased to 7,000 birds and was reclassified to threatened. The population has continued to increase, and numbered about 27,600 in 1997/98 (Appendix 1)(Drut and Trost 1998).

Description

Aleutian Canada geese resemble other small Canada goose subspecies such as the cackling Canada goose (*B. c. minima*), Taverner's Canada goose (*B. c. taverneri*), and lesser Canada goose (*B. c. parvipes*). The Aleutian goose is intermediate in size between cackling geese, the smallest race, and Taverner's goose, but there is overlap in measurements (Johnson et al. 1979).

Although there is currently no known single field characteristic that absolutely distinguishes Aleutian Canada geese from the other subspecies, a combination of morphological characters can separate most of the birds. Discriminate function analysis offers a useful method in this regard (Johnson et al. 1979).

Plumage criteria may also be used to help separate subspecies. The breast feathers of cacklers are darker than those of Aleutian geese, and have a purplish or tannish cast. Taverner's, lessers, and Aleutians are similar in breast color, usually
Figure 1. Aleutian Islands, Alaska.
ranging between brownish gray and grayish brown (Johnson et al. 1979). Nearly all Aleutians after their first winter have a ring of white feathers at the base of their black necks. Other subspecies also contain individuals with white neck rings, but in these subspecies the neck ring is incomplete or, if complete, it is generally narrower than neck rings of Aleutians. For example, P.G. Mickelson (unpubl. data) estimated that less than one-third of the thousands of adult cacklers he observed on the Yukon Delta, Alaska, had white neck rings, and most were less than 10 mm in width. Johnson et al. (1979) found that 23 percent of the Taverner's measured at Cold Bay, Alaska, had complete neck rings that averaged 3-5 mm in width.

Early attempts to genetically distinguish Canada goose subspecies indicated that Aleutian Canada geese were different from others (Morgan et al. 1977). Mitochondrial DNA studies have shown Aleutian geese to be associated with small-bodied forms of Canada geese that developed west and north of the Alaska Range (Shields and Wilson 1987). Further work demonstrated a clear distinction between Aleutian geese and the adjacent cackling Canada goose subspecies (Shields 1994). The taxonomic position of Aleutian geese, based on several recent works, is reviewed by Pierson et al. (in prep) who also have demonstrated differences between western Aleutian birds from Buldir Island (used as translocation stock) and the easternmost remnant population on the Semidi Islands.

II. GOALS AND OBJECTIVES

This plan identifies management actions, associated information needs, and agency responsibilities necessary to manage Aleutian Canada geese in the Pacific Flyway for the period from 1999-2004, subsequent to the removal of the species from listing under the Endangered Species Act. Unlike many other Pacific Flyway populations of geese, there are no scientifically-based historic estimates of population size to use as a guideline for the establishment of a population goal. The primary population goal of the recovery effort was to increase the number of birds from a low of about 800 to 7,500 (Byrd et al. 1991).

The overall goal for this Pacific Flyway management plan is to manage Aleutian Canada geese and other Canada goose populations with which they mix, to provide for optimal aesthetic, educational, scientific, and hunting uses throughout its range.
The objectives of this management plan are to:

A. Sustain an average annual growth rate of at least 5 percent for the Aleutian geese that winter in California for the period of this plan, with an interim population objective of 40,000 birds.

B. Continue to provide special management consideration to that segment of the Aleutian goose population from the Semidi Islands that winters in coastal Oregon.

C. Develop specific population objectives and related management actions.

D. Maintain and enhance a widely distributed breeding population throughout the historic nesting range.

E. Manage migration and wintering habitat of sufficient size and quality to sustain the desired population level of Aleutian Canada geese and to minimize agricultural depredation complaints from private landowners.

III. STATUS AND DISTRIBUTION

Historical Range and Abundance

Delineating the historic range of the Aleutian Canada goose is difficult due to the limited written records for the isolated region where it breeds and historical confusion about the taxonomic status of various populations of Canada geese. Nevertheless, anecdotal reports indicate that Aleutian Canada geese bred from the Geese Islands near Kodiak (E.P. Bailey pers. comm.) westerly on islands south of the Alaska Peninsula, throughout the Aleutian (Dall 1874, Turner 1886, Clark 1910, Jochelson 1933, Murie 1959) and Commander islands (Stejneger 1885) and at least as far southwest as the central Kuril Islands (Snow 1897) (Figure 1). Populations are said to have wintered from British Columbia to northern Mexico in North America and in Japan on the Asian side of the Pacific Ocean (Delacour 1954).

Apparently, remnant breeders survived the fox-farming era on only three fox-free islands, Kiliktagik in the Semidi Group (Hatch and Hatch 1983), Chagulak in the central Aleutians (Bailey and Trapp 1984), and Buldir in the western Aleutians (Jones 1963). Most of these geese occurred at Buldir Island with only a few pairs at the other islands. Almost nothing is known about the former abundance of this goose except statements by Clark (1910) that it bred in the thousands on Agattu Island. This same description of abundance was used by Turner (1886) for Agattu, and he added that the goose was an
abundant nester on Semichi (present-day Alaid, Nizki, and Shemya Islands) and occurred in large numbers in fall at Attu Island.

**Reason for Decline**

The decline of Aleutian Canada geese coincided with the onset of fur-farming on Alaskan and northeastern Asian islands. Arctic and red foxes were released on most goose nesting islands, principally between 1915 and 1939 but dating back as early as the 1750's (Gray 1939, Bailey and Kaiser 1993). Foxes decimated populations of many species of native birds, but the endemic geese were particularly susceptible to predation before the young birds fledged and when the molting adults became flightless. Their demise was apparently rapid as indicated by the following record for Agattu. In the early 1900’s Clark (1910) found geese to be abundant on Agattu, and he suggested that such abundance could be attributed to the absence of foxes. From 1923 to 1930 arctic foxes were released in several different years at Agattu (Gray 1939), and by 1936 over 1,000 pelts had been sold from there, indicating how common the foxes had become. In 1937, less than 15 years after the first foxes were released, Murie (1937) found only a few pairs of geese on Agattu, and they probably were extirpated soon thereafter.

**Recovery Efforts**

Delisting goals were: 1) an overall population of at least 7,500 geese, and an upward long-term trend; 2) at least 50 pairs of geese nesting in each of three geographic parts of the historic range for three or more consecutive years; and 3) a total of 25,000-35,000 acres of feeding and roosting habitat for migration and wintering, secured and managed for Aleutian geese (Byrd et al. 1991).

**Restoration Efforts on Breeding Grounds**

Staff at the Aleutian Islands National Wildlife Refuge (NWR) began active fox removal in 1949 using chemical toxicants followed by trapping and shooting. Arctic foxes were eliminated from Amchitka Island by the mid-1960s, by which time a remnant population of Aleutian Canada geese had been discovered at Buldir and captive rearing facilities were being developed. After passage of the Endangered Species Act, restoration efforts were intensified through fox removal, captive propagation and goose releases onto fox free islands (Appendix 2), and concurrent studies and banding of nesting geese.
Complete eradication of foxes, particularly from large islands, proved to be difficult. However, by 1991, foxes had been eliminated from at least eight other, mostly small, islands. Subsequent releases of captive-reared geese onto the newly fox-free islands, such as Amchitka, Agattu, and Nizki-Alaid during 1971-1982 had a low success rate. Consequently, captive propagation was phased out and family groups of wild geese from Buldir were captured and moved to those new islands for release.

The translocation of wild geese has been much more successful. However, predation by bald eagles (Haliaeetus leucocephalus) has proven to be a serious detriment to reestablishment of geese on islands east of Buldir, the western-most extent of this raptor's range. Thus, efforts to reestablish geese have been concentrated in the Near Island group, west of Buldir, where bald eagles do not occur. The absence of bald eagles in the Near Islands has allowed relatively high survival of released geese. Geese began to breed again on Agattu Island by 1984, and by 1990 the nesting population exceeded 50 pairs (Appendix 3). A second breeding population at Nizki-Alaid in the Near Island group was started by 1987. Due to continued translocations this population is expanding rapidly.

Restoration Efforts on Migration and Wintering Areas

Population studies and monitoring

When studies of wild geese started at Buldir in 1974 (Byrd and Woolington 1983), migration routes and wintering areas were unknown. Aleutian geese that had been marked with color leg bands at Buldir Island were subsequently discovered in several parts of California, providing the basis for delineating the primary use areas (Springer et al. 1978, Woolington et al. 1979). Monitoring of the major migration and wintering areas in California has been conducted annually since 1975.

Banding at Buldir, Chagulak, Kiliktagik, and in California, coupled with annual winter surveys, indicates that there are at least two distinct segments of Aleutian Canada geese. The Buldir, Agattu, and Nizki-Alaid (western Aleutian) breeders stage in fall and spring in northern coastal California, concentrate in fall in the Sacramento Valley, and spend the winter in the northern San Joaquin Valley (Figure 2). Some western Aleutian birds, plus geese from Chagulak Island in the central Aleutian Islands, also use an area east of San Francisco Bay before joining the main flock in the San Joaquin Valley. In contrast, the Kiliktagik (Semidi Islands) breeders winter in coastal Oregon (Lowe 1990, Figure 3).

Since the mid-1970's one or more Aleutian Canada geese have been observed during winter in Japan, and during the 1980's captive-reared birds from zoos in Japan have been released with the wild geese in hopes of increasing this population. Aleutian
Figure 2. Wintering Areas and Hunting Closure Zones in California.
Figure 3. Wintering Areas and Hunting Closure Zones in Oregon.
Canada geese were reported to be fairly common winter visitors to Japan until 1922 when less than 200 birds were noted (Austin and Kuroda 1953). As indicated above, in the early 1990's interest has been expressed by the Russians and Japanese in a cooperative program designed to reestablish Aleutian Canada geese in Asia.

**Hunting Closures**

Data on the distribution of Aleutian geese were used to delineate areas that were closed to the hunting of Canada geese to protect these birds. The area in Alaska west of Unimak Pass was closed to Canada goose hunting beginning in 1973, and three areas in California were closed beginning in 1975 (Figure 2). Additional goose hunting closures to protect migrating and wintering Aleutian Canada geese in Oregon were instituted in 1982 (Figure 3). A Flyway-wide closure for cackling and Aleutian Canada geese was implemented in 1984. The closure on cackling Canada geese ended in 1994.

**Habitat Protection and Management**

Most historic nesting islands in Alaska are within the Alaska Maritime National Wildlife Refuge, therefore, nesting areas are likely to be protected in the long term under existing public ownership. Maintenance of the Aleutian Canada goose is an important refuge priority.

Since the beginning of the Aleutian Canada goose recovery effort, habitat acquisition and easement programs have resulted in the protection of many of the important areas of Aleutian Canada goose migration and wintering habitat in California. In the spring staging area near Crescent City, offshore roosting habitat was protected through creation of the Castle Rock NWR in 1979 and mainland foraging habitat protected through establishment of the Lake Earl Wildlife Area in 1980. In 1987, the Fish and Wildlife Service established the San Joaquin River NWR at the main Aleutian Canada goose wintering area in the northern San Joaquin Valley. In addition, recent State and Federal land acquisitions and conservation easement enrollments throughout the Sacramento and San Joaquin Valley for other waterfowl and endangered species initiatives have resulted in a large amount of Aleutian Canada goose habitat being protected. Nevertheless, urbanization, other changing land use practices, disease, and chemical pollution continue to pose a threat to geese; thus, a continuing program is needed to insure long-term habitat protection for a restored population of Aleutian Canada geese.

In Oregon, the major areas used by wintering Aleutian geese (primarily birds breeding in the Semidi Islands) are in private ownership. Nevertheless, the Service obtained authorization in 1990 to establish the Nestucca Bay National Wildlife Refuge which includes areas used by the Semidi Island segment of Aleutian geese. Migrating Aleutian geese from at least the western Aleutian breeding segment use coastal areas in both private and public ownership during migration. One important migration stop,
near New River, Oregon, is owned and managed by the Bureau of Land Management who, in cooperation with The Nature Conservancy, plan to acquire additional important areas from willing sellers.

Present Status and Distribution

Breeding Range

As of summer 1995, the last year for which census data are available from the breeding grounds, approximately 4,000 pairs of Aleutian Canada geese were estimated to breed in the Aleutian Islands, including at least 3,500 pairs at Buldir Island, 350 pairs at Agattu Island, 124 pairs at Alaid/Nizki Islands, 5 pairs in the Rat Islands, and 20 pairs at Chagulak Island (Byrd 1995). Breeding geese have been documented recently at Amchitka, Amukta, and Little Kiska Islands, although the current status of Aleutian Canada geese on these islands is unknown. The presence of bald eagles on islands east of Buldir Island is believed to be a factor that has limited the success of translocations to Amchitka, Little Kiska and Kiska Islands.

The small breeding population on Chagulak Island is believed to be stable, but the terrain is steep and nesting habitat is limited. Foxes have been removed from most of the islands near Chagulak, and to bolster the population of geese in this portion of the Aleutians, translocations of geese from Buldir Island to Yunaska Island occurred in 1994 and 1995. Translocations also occurred in 1994 and 1995 to Skagul Island in the Rat Island group. At this time it is unclear if the translocations have resulted in establishment of breeding populations on these islands.

In the Semidi Islands, investigators studying these geese found only 14 nests on Kiliktagik Island and 3 nests on Anowik Island in 1995, which is 11 nests fewer than were found on the same islands in 1992 (Beyersdorf and Pfaff 1995). Hatching and overall nesting success of geese in the Semidi Islands in 1995 was lower than their counterparts in the western Aleutian Islands. In addition, relatively few hatching year birds have been appearing on the wintering grounds each fall in coastal Oregon (D. Pitkin and R. Lowe pers. comm.). The reason for lower productivity of Aleutian Canada geese in the Semidi Islands is unknown although nest success is poorly documented and abnormalities have been noted in hatchlings. Geese from the Semidi Islands winter exclusively in coastal Oregon.

The availability of nesting habitat in the Aleutian Islands is not likely to limit population growth in the foreseeable future. There is considerable unoccupied nesting habitat available for geese on some of the existing nesting islands, and there are at least eight other islands with suitable nesting habitat where foxes have been removed that are available for natural recolonization. The Service is also continuing its fox eradication program in the Aleutian Islands to benefit geese and other ground nesting birds. Despite the availability of nesting habitat, rapid natural expansion to unoccupied
islands is not expected to occur because of the presence of bald eagles and the strong tendency for Canada geese to return to natal areas to breed.

**Migration and Wintering Range**

By the winter of 1997-98, peak counts of Aleutian geese in California (from segments in the western and central Aleutian Islands) reached about 27,600 (Drut and Trost 1998) up from less than 800 geese in spring 1975 (Appendix 1). The population of geese wintering in Oregon (Semidi breeders) numbered about 118 individuals in spring 1998, up from about 70 birds in the early 1980's (Appendix 4).

On migration and wintering grounds in California and Oregon, Aleutian Canada geese depend on agricultural lands and have shown strong fidelity to certain areas. They feed extensively in agricultural fields with waste beans and grain, and graze on sprouting grain and in pastures used by livestock (Dahl 1995).

Fall migrating Aleutian Canada geese first arrive in California in early October. Varying numbers stop in the Crescent City area in northwest California before continuing southward. A large proportion of the population moves into the Sacramento Valley onto private agricultural and Federal refuge lands in the Butte Sink and near Colusa. Traditionally, most of these birds remained in the area through late November. However, over the past decade, increasing numbers have been flying directly to the San Joaquin Valley. Over 98 percent of the Aleutian Canada goose population ultimately occupies the main wintering area at the San Joaquin River NWR and adjacent Faith and Mapes’ Ranches near Modesto each winter. Other regular use areas during winter include the El Sobrante area east of San Francisco Bay, the Sacramento-San Joaquin Delta, reservoirs in the Merced and Stanislaus counties, and the Grasslands Area of Merced County. However, band observations and direct tracking have shown that most of that use originates from the Modesto area.

Northward migration begins by early February when Aleutian Canada geese start leaving the Modesto area and move to the spring staging area near Crescent City. By late March, virtually all the geese have shifted to that spring staging area. There, the geese roost at night on Castle Rock and, to a lesser extent, Prince Island (an offshore island owned by Native Americans) and feed during the day on the mainland. Several hundred acres of grassland foraging habitat are managed on State lands at the Lake Earl Wildlife Area (California Dept. of Fish and Game) and the Lake Earl Project (California Dept. Parks and Recreation). However, Aleutian Canada geese feed primarily on intensively managed pastures on private dairy farms. As the population increased, such use is now in conflict with several local landowners. Geese begin departing northward in late April and by early May are virtually all gone.
In Oregon, the Semidi Island geese forage primarily on the pastures of two dairy farms near Pacific City. Both dairies are privately owned but are included within the boundaries of the Nestucca Bay National Wildlife Refuge which would facilitate their acquisition should the Service and the landowners reach a purchase agreement in the future. The refuge has acquired 120 acres of nearby pasture that is being used by Dusky Canada geese and could be used by Aleutian Canada geese in the future. The Semidi Island geese either roost on the ocean or on Haystack Rock which is part of the Oregon Islands National Wildlife Refuge. Several thousand Aleutian Canada geese from breeding sites in the Aleutian Islands began using coastal southern Oregon as a stopover for several weeks in spring during the late 1990's. These birds forage on privately-owned pasture and roost on offshore rocks in the Oregon Islands National Wildlife Refuge.

In Washington, small numbers of Aleutians are found primarily in southern Willapa Bay (Reikkola Unit of Willapa NWR and adjacent Holtz Ranch) during fall migration, mainly during October and November. A peak count of 330 for Willapa was recorded during November 1996. Aleutians are typically not sighted during December and January in Willapa Bay. Harvested geese are sometimes classified as Aleutians (up to 3 per year) at southwest Washington hunter check stations, but the classification criteria currently used to discern dusky Canada geese (culmen length and breast color) do not reliably separate Aleutians from Taverner's. Only one banded Aleutian has been harvested in this area, in October 1983. Small numbers of Aleutians have been recorded during spring migration through Willapa Bay.

IV. PUBLIC USE

Canada geese are of interest to the public wherever they occur, and Aleutians are of special interest to the public because of their relative rarity and listed status. Non-consumptive use of California state wildlife areas increased from 53,966 visits in 1973-74 (Calliga 1983) to 223,000 in 1994 (T. Blankinship, Department of Fish and Game, pers. comm.). Total non-consumptive use at Sacramento NWR, alone, in 1996 was 62,500 visits (D. Dachner, Sacramento NWR, pers. comm.). Visits elsewhere are known to occur, but are not measured.

V. CURRENT MANAGEMENT PRACTICES

Breeding Range

Currently, periodic ground-based surveys are conducted to estimate the number of breeding pairs. These surveys are not conducted annually nor simultaneously on all islands where geese are known to nest because of logistical difficulties in the Aleutian Islands. Improvements to habitat are occurring primarily by the continued removal of foxes. Recent translocations have focused on the central Aleutian Islands. The Service is in the process of removing foxes from 12 additional islands between 1998 and 2004, and plans to restore 223,000-acre Attu Island in 1999. Attu Island is close to Agattu
Island and Alaid-Nizki islands, both of which are Aleutian Canada goose nesting islands, and would provide a substantial amount of nesting habitat if it was ever colonized. Once cleared of foxes, transplants of family groups of Aleutian Canada geese to Attu Island would be logistically feasible in the future.

Recently, Siberian scientists have begun reestablishing Aleutian geese in the Asian portion of their historic range by releasing captive-reared geese. The project is a cooperative venture with the Japanese. Although the scope of this Management Plan is confined to the Pacific Flyway, continued cooperation with Asian biologists by providing technical assistance and geese for release is anticipated.

Migration and Wintering Range

Full time monitoring has been conducted each winter from 1975 through 1999 in California to determine population size, habitat use, mortality threats, and survival rates. A similar level of effort has also been conducted in coastal Oregon for many of those years. In California, direct counts, observations of color-marked geese, and ratios of marked:unmarked geese are made as part of that monitoring program to determine population size and survival during winter and spring. Direct counts are made throughout the winter on the Oregon coast to monitor the geese from the Semidi Islands.

Hunting closures have been in place range-wide since as early as 1973 to reduce the harvest of migrating and wintering Aleutian geese. The take of all Canada geese is prohibited in these areas, benefitting both Aleutian and cackling Canada geese.

In California, the primary wintering area near Modesto is being protected and managed for Aleutian Canada goose. The Fish and Wildlife Service currently manages approximately 1,100 acres of the 5,588-acre San Joaquin River NWR as irrigated pasture, agricultural food crops, and roost pond habitat for the geese. In addition to providing goose foraging, loafing, and roosting habitat on Refuge lands, the Service is assisting local cooperators to enhance their lands for geese by providing technical assistance. The intent is to provide high quality habitat for Aleutian Canada geese while holding them on managed lands to reduce crop depredation on neighboring private farms. In addition, negotiations are underway to acquire additional fee-title lands and establish perpetual conservation easements for the two adjoining ranches to attain a planned refuge size of 12,877 acres (combination fee and easement).
V. PROBLEMS

< There are no established long-term population objectives for this goose population.

< In spite of notable acquisitions during the recovery program, public lands managed for these geese are limited, especially along the northwest coast of California but potentially throughout the migration and wintering range, which places extra emphasis on the effect of goose foraging on private lands where geese conflict with private interests.

< Changing agricultural practices and other land uses may negatively affect current migration and wintering areas.

< Additional funding is needed for management of public lands to provide optimum feeding conditions for geese.

< Avian cholera continues to result in the loss of Aleutian geese.

< Adverse climatic conditions, such as drought, may adversely affect winter habitat quality and induce undesirable changes in land use practices.

< Bald Eagle predation (and the lack of native fauna as buffer prey) east of Buldir Island may limit further expansion of nesting geese in the central Aleutians.

< Foxes still exist on Attu and Shemya Islands in the Near Island Group, where potential for restoration of geese is particularly high due to the absence of eagles.

< Introduced rats and ground squirrels may indirectly limit further expansion of nesting geese on some former nesting islands because these introduced animals preclude recovery of buffer prey species for eagles once foxes are removed.

VI. RECOMMENDED MANAGEMENT ACTIONS

The following management procedures are recommended even though the degree and timing of their implementation by the agencies involved may be influenced by human resource, fiscal and legislative constraints. Whenever possible, management procedures in this plan should be integrated into and addressed in other plans for Pacific Flyway populations.
A. Habitat

1. **Protect and manage breeding habitat** Continue to remove introduced foxes and other introduced predators (e.g. ground squirrels) from additional islands within the former breeding range and prevent accidental introductions of rats to existing or potential nesting islands by activating a ship-wreck response plan.

   Lead Agency: USFWS R-7  
   Participating: ADFG, USCG  
   Priority: 2  
   Schedule: ongoing

2. **Protect and manage migration and wintering habitat** Provide adequate funding to protect and manage goose use areas.

   Lead Agency: USFWS R-1  
   Participating: CDFG, ODFW  
   Priority: 1  
   Schedule: ongoing

3. **Depredation Management**: Reduce the effects of geese foraging on private lands by better management of public lands, acquisition (by fee title or easement) and other methods.

   Lead Agency: CDFG, ODFW  
   Participating: USDA, USFWS R-1  
   Priority: 2  
   Schedule: ongoing

B. Population Inventories

1. **Annual winter population indices**: During this planning period, continue to acquire both total population indices from spring counts on the northwest coast of California and mark-resight estimates for the geese wintering in California. Continue to inventory the geese that winter in coastal Oregon through direct counts.

   Lead Agency: USFWS R-1, MBMO  
   Participating: CDFG, ODFW  
   Priority: 1  
   Schedule: ongoing
2. **Annual marking and banding**: During this planning period, continue to annually neck-collar 200 birds in California. Where possible, mark an additional 200 birds with leg bands only.

   Lead Agency: USFWS R-1  
   Participating: CDFG  
   Priority: 1  
   Schedule: ongoing

3. **Periodic breeding population estimates**: At least once during this 5-year planning period, assess the nesting populations at each major breeding area. When feasible, survey other potential nesting areas in the historic breeding range.

   Lead Agency: USFWS R-7  
   Participating: ADFG  
   Priority: 1  
   Schedule: by 2004

C. **Population Management**

1. **Population objective**: During the 5-year planning period, develop a specific long-term objective for the population, considering habitat and other constraints. This objective should be based on modeling of both the population and habitat carrying capacity.

   Lead Agency: Study Committee  
   Participating: USFWS MBMO  
   Priority: 1  
   Schedule: by 2001

2. **Harvest strategy**: Concurrent with the development of a population objective, develop a specific strategy that establishes harvest levels commensurate with population objective(s).

   Lead Agency: Study Committee  
   Participating: USFWS  
   Priority: 1  
   Schedule: 2001
3. **Interim harvest management**: During the development of a population objective and a long term harvest strategy: 1) remove statewide take prohibitions in California, Washington, Oregon and Alaska and; 2) maintain Canada goose closures in specific areas of California, Oregon and Alaska, modifying where necessary in response to distributional changes of Aleutian geese.

   Lead Agency: USFWS  
   Participating: Study Committee  
   Priority: 1  
   Schedule: ongoing

4. **Translocations**: Continue to translocate geese from the western Aleutian Islands to fox-free nesting islands in the central Aleutians (e.g. Skagul, Yunaska, Kanaga) and to Attu, after foxes are removed there.

   Lead Agency: USFWS R-7  
   Participating: ADFG  
   Priority: 2  
   Schedule: ongoing (until at least 50 pairs are nesting on target islands)

5. **Disease control**: Conduct regular surveillance to detect outbreaks on major wintering and migration areas. At the onset of outbreaks, implement disease control activities as outlined in the Aleutian Canada Goose Disease and Contamination Hazard Contingency Plan (Byrd et al. 1996).

   Lead Agency: USFWS R-1, USGS-BRD  
   Participating: CDFG, ODFW  
   Priority: 1  
   Schedule: ongoing

6. **International cooperation**: Support recent efforts by the Service and others to restore Aleutian geese to an eastern Asian flyway. Cooperation is needed with the Russian Federation, Japan and others to continue this effort.

   Lead Agency: USFWS  
   Participating: Council  
   Priority: 3  
   Schedule: ongoing
D. Research

1. Limiting factors for Semidi Island nesting geese: Research is needed to determine what factors are preventing these geese from increasing. Despite the elimination of harvest mortality for these geese, the population has not responded as have the Aleutians from the western Aleutian Islands.

   Lead Agency: USFWS R-7, USGS-BRD
   Participating: ADFG, ODFW
   Priority: 1
   Schedule: 2004

2. Control of disease losses: Research is needed on methods to prevent, or further reduce the effects of outbreaks. In recent years, avian cholera has been an increasing problem and is the most important known form of mortality for Aleutian geese wintering in California.

   Lead Agency: USGS-BRD, USFWS R-1
   Participating: CDFG
   Priority: 2
   Schedule: ongoing

F. Plan Implementation and Review

The Aleutian Canada Goose Subcommittee shall meet twice annually or as needed to review progress toward achieving the goals and objectives of this plan and to recommend actions and revisions. The Subcommittee shall report through the Pacific Flyway Study Committee on accomplishments and shortcomings of the cooperative management effort to the Pacific Flyway Council, those state and federal agencies having management responsibilities, and those agencies and organizations either interested or cooperating in the management of these geese. This Subcommittee shall coordinate management activities with those of the Lesser Canada Goose (Taverner’s, Lessers) Subcommittee, the Cackling Canada Goose Subcommittee, the Pacific Population of Western Canada Goose Subcommittee, and the Rocky Mountain Population of Canada Goose Subcommittee.

The Subcommittee shall be comprised of a representative from each federal and state agency having management responsibility for this population. It shall be the responsibility of those members to assure that the objectives and procedures of this plan are integrated and coordinated with those plans and activities of the various wildlife and land management agencies and local planning systems within their agency’s purview. Chairmanship shall be appointed biannually and rotated among member
agencies. The Subcommittee will exercise its prerogative to invite any individual, group, agency or representative whose expertise, counsel or managerial capacity is required for the coordination and implementation of management programs, to attend and participate (ex officio) at meetings.

Lead Agency/Group: Subcommittee
Priority: 1
Schedule: Twice annually - at the March and July meetings of the Pacific Flyway Study Committee. Schedule for rotation is:

Beginning October 1:

1998 - California
2000 - USFWS (Region 1)
2002 - Alaska
2004 - Washington
2006 - Oregon
2008 - USFWS (Region 7)
2010 - California
VII. LITERATURE CITED


Appendix 1. Aleutian Canada Goose Peak Counts (usually in Spring) From California

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>790</td>
</tr>
<tr>
<td>75</td>
<td>900</td>
</tr>
<tr>
<td>76</td>
<td>1280</td>
</tr>
<tr>
<td>77</td>
<td>1500</td>
</tr>
<tr>
<td>78</td>
<td>1590</td>
</tr>
<tr>
<td>79</td>
<td>1740</td>
</tr>
<tr>
<td>80</td>
<td>2000</td>
</tr>
<tr>
<td>81</td>
<td>2700</td>
</tr>
<tr>
<td>82</td>
<td>3500</td>
</tr>
<tr>
<td>83</td>
<td>3800</td>
</tr>
<tr>
<td>84</td>
<td>4200</td>
</tr>
<tr>
<td>85</td>
<td>4300</td>
</tr>
<tr>
<td>86</td>
<td>5000</td>
</tr>
<tr>
<td>87</td>
<td>5400</td>
</tr>
<tr>
<td>88</td>
<td>5800</td>
</tr>
<tr>
<td>89</td>
<td>6300</td>
</tr>
<tr>
<td>90</td>
<td>7000</td>
</tr>
<tr>
<td>91</td>
<td>7680</td>
</tr>
<tr>
<td>92</td>
<td>11680</td>
</tr>
<tr>
<td>93</td>
<td>15700</td>
</tr>
<tr>
<td>94</td>
<td>19150</td>
</tr>
<tr>
<td>95</td>
<td>21420</td>
</tr>
<tr>
<td>96</td>
<td>22800</td>
</tr>
<tr>
<td>97</td>
<td>27600</td>
</tr>
</tbody>
</table>
Appendix 2. Summary of translocations and releases of Aleutian Canada geese (all in western Aleutians).

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
<th>Released</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Captive-reared</td>
<td>75</td>
<td>Amchitka</td>
</tr>
<tr>
<td>1974</td>
<td>Captive-reared</td>
<td>41</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Translocated from Buldir</td>
<td>9</td>
<td>Agattu</td>
</tr>
<tr>
<td>1976</td>
<td>Captive-reared</td>
<td>26(^1)</td>
<td>Amchitka</td>
</tr>
<tr>
<td></td>
<td>Translocated from Buldir</td>
<td>3</td>
<td>Amchitka</td>
</tr>
<tr>
<td>1978</td>
<td>Captive-reared</td>
<td>117</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Translocated from Buldir</td>
<td>22</td>
<td>Agattu</td>
</tr>
<tr>
<td>1979</td>
<td>Captive-reared</td>
<td>199</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Wild, captive-held</td>
<td>8</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Translocated from Buldir</td>
<td>35</td>
<td>Agattu</td>
</tr>
<tr>
<td>1980</td>
<td>Golden Birds(^2)</td>
<td>48</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Translocated from Buldir</td>
<td>60</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Captive-reared</td>
<td>116</td>
<td>Amchitka</td>
</tr>
<tr>
<td></td>
<td>Wild, captive-held</td>
<td>3</td>
<td>Amchitka</td>
</tr>
<tr>
<td></td>
<td>Captive-reared</td>
<td>20</td>
<td>Buldir</td>
</tr>
<tr>
<td>1981</td>
<td>Golden Birds</td>
<td>111</td>
<td>Nizki</td>
</tr>
<tr>
<td></td>
<td>Captive-reared</td>
<td>250</td>
<td>Nizki</td>
</tr>
<tr>
<td></td>
<td>Wild, captive-held</td>
<td>2</td>
<td>Nizki</td>
</tr>
<tr>
<td>1982</td>
<td>Golden Birds</td>
<td>210</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Captive-reared</td>
<td>64</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Wild, captive-held</td>
<td>17</td>
<td>Agattu</td>
</tr>
<tr>
<td></td>
<td>Translocated from Buldir</td>
<td>138</td>
<td>Agattu</td>
</tr>
<tr>
<td>1983</td>
<td>Translocated from Buldir</td>
<td>108</td>
<td>Agattu</td>
</tr>
<tr>
<td>1984</td>
<td>Translocated from Buldir</td>
<td>86</td>
<td>Agattu</td>
</tr>
<tr>
<td>1985</td>
<td>Translocated from Buldir</td>
<td>124</td>
<td>Amchitka</td>
</tr>
<tr>
<td>1986</td>
<td>No Translocations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>Translocated from Buldir</td>
<td>136</td>
<td>Amchitka</td>
</tr>
<tr>
<td>1988</td>
<td>Translocated from Buldir</td>
<td>116</td>
<td>L. Kiska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>Nizki</td>
</tr>
<tr>
<td>1989</td>
<td>Translocated from Buldir</td>
<td>25</td>
<td>L. Kiska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>118</td>
<td>Nizki</td>
</tr>
<tr>
<td>1990</td>
<td>Translocated from Buldir</td>
<td>25</td>
<td>L. Kiska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38</td>
<td>Nizki</td>
</tr>
<tr>
<td>1991</td>
<td>Translocated from Buldir</td>
<td>55</td>
<td>L. Kiska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92</td>
<td>Nizki</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36</td>
<td>Agattu</td>
</tr>
</tbody>
</table>
Appendix 2. Continued. Summary of translocations and releases of Aleutian Canada geese (all in western Aleutians).

<table>
<thead>
<tr>
<th>Year</th>
<th>Translocated from Buldir</th>
<th>Quantity</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>L. Kiska</td>
<td>60</td>
<td>Nizki</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>Skagul</td>
<td>70</td>
<td>Yunaska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>Skagul</td>
<td>81</td>
<td>Yunaska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>87</td>
<td></td>
</tr>
</tbody>
</table>

1. All birds not lost to bald eagle predation (17) were recaptured when they failed to migrate.

2. Wild, captive-held males paired with captive-reared females, released with their young, foster young, and associated birds.
Appendix 3. Nesting pairs of Aleutian Canada geese at different islands.

<table>
<thead>
<tr>
<th>Island</th>
<th>Group</th>
<th>Nesting Pair Estimate</th>
<th>Year of Estimate</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agattu</td>
<td>Near</td>
<td>275-300</td>
<td>1994</td>
<td>Increasing</td>
</tr>
<tr>
<td>Nizki-Alaid</td>
<td>Near</td>
<td>200-250</td>
<td>1998</td>
<td>Increasing</td>
</tr>
<tr>
<td>Buldir</td>
<td>Rat</td>
<td>thousands</td>
<td>no recent estimate</td>
<td>Increasing</td>
</tr>
<tr>
<td>L. Kiska</td>
<td>Rat</td>
<td>1-2</td>
<td>1994</td>
<td>Decreasing</td>
</tr>
<tr>
<td>Amchitka</td>
<td>Rat</td>
<td>2-5</td>
<td>1994</td>
<td>Unknown</td>
</tr>
<tr>
<td>Chagulak</td>
<td>Andreanof</td>
<td>18-21</td>
<td>1993</td>
<td>Stable</td>
</tr>
<tr>
<td>Amukta</td>
<td>Andreanof</td>
<td>1</td>
<td>1993</td>
<td>Nest found in 1989 not active in 1993</td>
</tr>
<tr>
<td>Kiliktagik</td>
<td>Semidi</td>
<td>14</td>
<td>1995</td>
<td>Decreased from 1991</td>
</tr>
<tr>
<td>Anowik</td>
<td>Semidi</td>
<td>3</td>
<td>1995</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Season</th>
<th>Peak Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>79/80</td>
<td>80</td>
</tr>
<tr>
<td>80/81</td>
<td>85</td>
</tr>
<tr>
<td>81/82</td>
<td>60</td>
</tr>
<tr>
<td>82/83</td>
<td>69</td>
</tr>
<tr>
<td>83/84</td>
<td>78</td>
</tr>
<tr>
<td>84/85</td>
<td>92</td>
</tr>
<tr>
<td>85/86</td>
<td>85</td>
</tr>
<tr>
<td>86/87</td>
<td>131*</td>
</tr>
<tr>
<td>87/88</td>
<td>103</td>
</tr>
<tr>
<td>88/89</td>
<td>105</td>
</tr>
<tr>
<td>89/90</td>
<td>115</td>
</tr>
<tr>
<td>90/91</td>
<td>128</td>
</tr>
<tr>
<td>91/92</td>
<td>140</td>
</tr>
<tr>
<td>92/93</td>
<td>132</td>
</tr>
<tr>
<td>93/94</td>
<td>122</td>
</tr>
<tr>
<td>94/95</td>
<td>111</td>
</tr>
<tr>
<td>95/96</td>
<td>107</td>
</tr>
<tr>
<td>96/97</td>
<td>114**</td>
</tr>
<tr>
<td>97/98</td>
<td>118**</td>
</tr>
<tr>
<td>98/99</td>
<td>123**</td>
</tr>
</tbody>
</table>

*Peak count reported as 131, but Aleutian breeders (WACG) were almost certainly present based on count records. The actual peak was probably somewhere between 106 and 116.

**Varying numbers of WACG were present in the Semidi flock all winter during these seasons. Figures listed are the maximum possible peak Semidi numbers. These numbers are derived by adding the number of HY birds present to the previous season’s population count prior to spring migration (if known), or to the previous season’s maximum population count, minus any known mortalities of marked birds.

For example, in 95/96, the peak count was 107, and 105 geese survived to spring migration. The next season (96/97) there were 130 geese in the flock, but only 11 were HY birds. 11 HY birds were added to the previous season’s survival of 105 (116 total) and subtracted two marked birds that had disappeared from the flock since the previous spring, resulting in a maximum possible Semidi Islands flock total of 114 geese. The actual flock total was probably less than 114, because unmarked geese could also have died, and some of the HY birds could have been WACG instead of Semidi Islands breeders. Before HY counts were instituted, the 96/97 Semidi flock would have been incorrectly tallied at 130 geese.