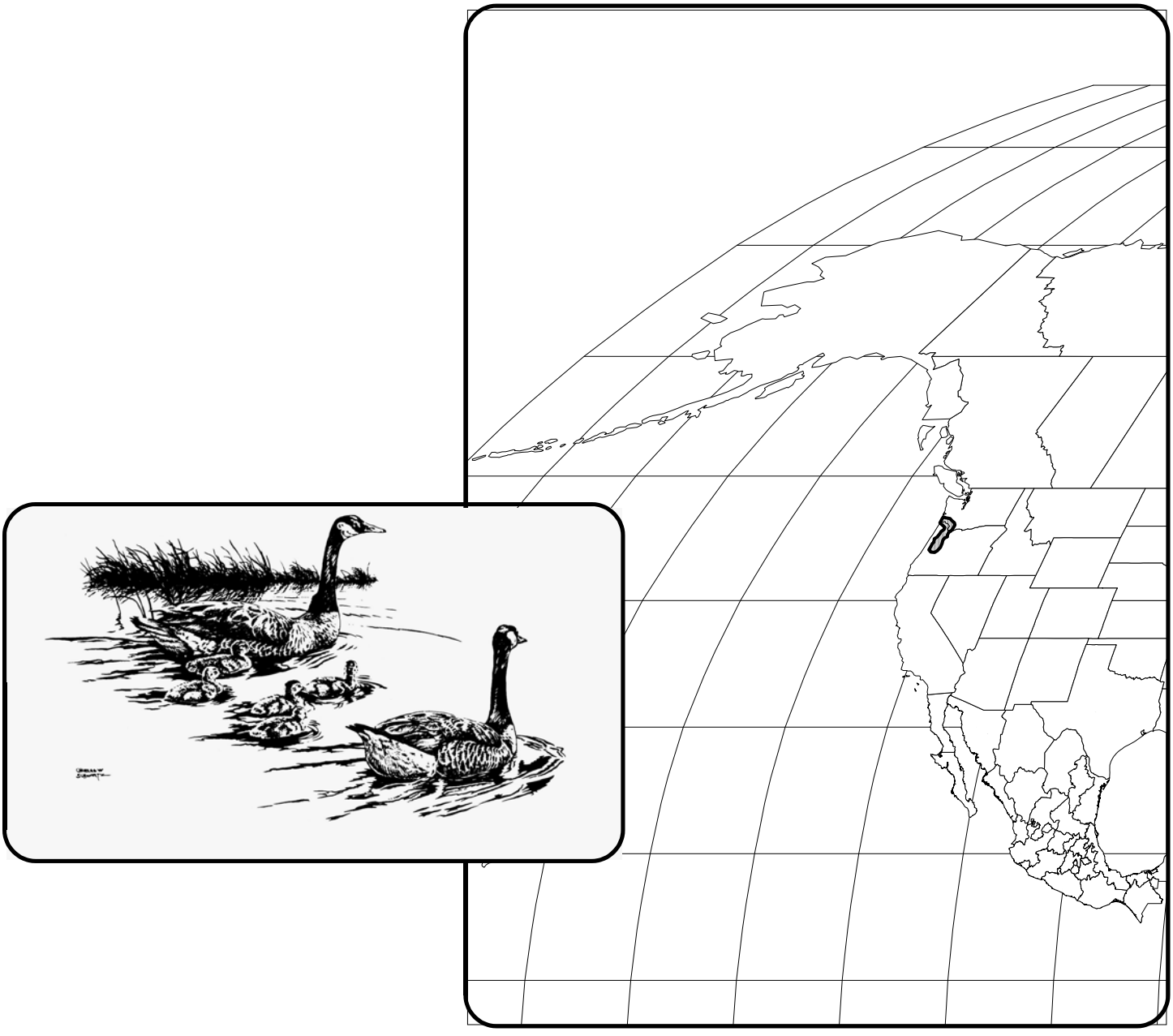
Northwest Oregon / Southwest Washington Canada Goose Agricultural Depredation Control



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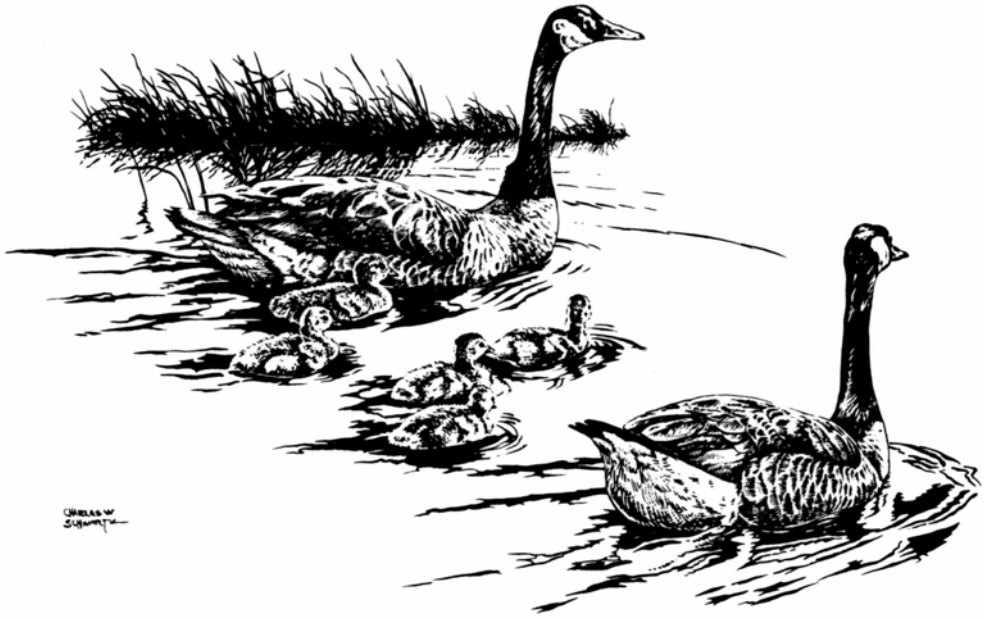
MARCH, 1998



PACIFIC FLYWAY MANAGEMENT PLAN

FOR

NORTHWEST OREGON - SOUTHWEST WASHINGTON

CANADA GOOSE AGRICULTURAL DEPREDATION CONTROL

Prepared for the:

Pacific Flyway Council
U.S. Fish and Wildlife Service
U.S. Department of Agriculture - APHIS, Wildlife Services

by the

Pacific Flyway Study Committee
and the
Canada Goose Agricultural Depredation Working Group

Approved by: _____ _____

Chairman, Pacific Flyway Council Date

Suggested Citation: Pacific Flyway Council. 1998. Pacific Flyway management plan for Northwest Oregon - Southwest Washington Canada goose agricultural depredation control. Canada goose agricultural depredation working group, Pacific Flyway Study Comm. [c/o USFWS], Portland, OR 97232-4181. Unpubl. Rept. 31pp. + appendices.

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EXECUTIVE SUMMARY

At the recommendation of the Pacific Flyway Council (PFC) (March 16, 1997, Recommendation No. 18), the U.S. Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), Animal and Plant Health Inspection Service - Wildlife Services (WS) and the Oregon and Washington Farm Bureaus have participated in the development of a comprehensive nine-point plan to address the agricultural depredation problems associated with Canada geese in the Willamette Valley - Lower Columbia River (WV-LCR). This document was available for public comment and responses are available upon request from the Pacific Flyway Representative, 911 NE 11th Avenue, Portland, Oregon, 97232. Many of the proposed strategies contained in this document are, at present, unfunded by any agency or organization. Addressing many of the proposed strategies will require additional resources or reprogramming existing resources away from other high priority issues. Participation in the development of the plan should not be interpreted as endorsement of all options by the participating agencies or organizations.

Primary Goal:

The primary goal for this plan is to establish a systematic and comprehensive approach for minimizing depredation losses caused by Canada geese in the WV-LCR.

The following primary objectives will be utilized to implement the plan. None of these objectives are intended to meet this goal alone, but, rather were established to work in concert and to provide a range of options to solve the problem. The primary objectives of the plan are:

1. **Wintering Canada Goose Population Objective**: Stabilize and eventually reduce the number of Canada geese wintering in the WV-LCR to minimize agricultural depredations on private lands. The objective is to limit the number of Canada geese wintering in the WV-LCR to no more than 133,000, the current population index (as measured by the midwinter inventory), and reduce the number of wintering Canada geese in the WV-LCR to 107,000 (20%, as measured by the same index) by the year 2002. Such reductions are to occur consistent with existing Flyway management goals for specific Canada goose populations recognized in the Pacific Flyway and the broad public interests throughout their range. The reductions will be achieved either through direct population reductions or redistribution of geese to other areas.

2. **Population Assessment and Monitoring Objective**: Develop and employ monitoring techniques to accurately assess goose populations, distribution and

survival rates of Canada geese on breeding and wintering grounds. The objectives are to develop and implement survey techniques to better assess the population status of all the Canada goose populations affiliated with the WV-LCR. This will involve improvements in both breeding ground and wintering area survey programs for these Canada goose populations. The use of mark-resight surveys to determine population size, distribution and survival of Canada geese wintering in WV-LCR will continue to be vital to the assessment of the management programs.

3. **Habitat Management and Public Use Objective**: Increase the amount of Canada goose use on public lands, while subsequently decreasing the amount of Canada goose use on private lands. The approach will be to review habitat management programs on Federal refuges and State wildlife areas to assure that everything possible is being done to provide abundant, high quality goose forage on public lands. Additionally, management agencies will implement public use restrictions on public lands to decrease harassment of wintering Canada geese and increase their use of these lands. Finally, management agencies will recognize private landowners for their role in providing Canada goose foraging areas on selected private lands and consider developing voluntary agreement, conservation easement, or coordinated hunting programs to address adverse agricultural impacts.

4. **Land Acquisition and Management Objective**: Decrease agricultural depredation of private lands by acquiring additional Canada goose habitats in the WV-LCR through fee title acquisition, donation, trade or easement. The approach will be to form a land acquisition working group consisting of personnel from USFWS, ODFW, WDFW and private conservation organizations to develop and implement a Canada goose habitat acquisition program. This group will be integrated with other existing agency efforts to maintain and enhance wildlife habitat throughout the WV-LCR region.

5. **Depredation Research Objective**: Objectively determine the severity and extent of winter goose grazing on private agricultural lands. The approach will be to conduct damage assessment studies of goose grazing impacts on grass seed, grain, vegetable crop and pasture lands in the WV-LCR to objectively determine the extent, amount and economic cost of damage from geese.

6. **USDA-APHIS Activity Objective**: Increase the capability of WS agents to assist private landowners in the WV-LCR to alleviate agricultural depredations caused by Canada geese. The approach will emphasize development of a WS hazing program designed to effectively monitor and address agricultural depredation complaints throughout the WV-LCR and to redistribute geese from areas where agricultural damage is occurring. Additionally, an evaluation will be conducted to determine the potential effectiveness of using depredation permits and/or orders

consistent with Pacific Flyway policy to further reduce agricultural depredation by Canada geese in the WV-LCR. The relative and combined effectiveness of nonlethal and lethal control to address crop damage problems in the region will be reviewed during all stages of implementation. Lethal control methods would only be used on a limited basis and would be consistent with the existing Pacific Flyway policy on depredation control (Appendix E).

7. **Harvest Management Objective**: Increase Canada goose hunting opportunities in accordance with harvest guidelines in Pacific Flyway population management plans. The approach is to first utilize hunting opportunity during established open seasons to reduce agricultural depredation of Canada geese in the WV-LCR by increasing harvests to limit overall populations consistent with Flyway population management goals and to redistribute geese from areas where agricultural damage is occurring.

8. **Public Outreach Objective**: Increase public awareness of both the benefits and problems associated with Canada geese throughout the Pacific Flyway. The approach will be to develop a public outreach program to increase the awareness and understanding of Canada geese and agricultural depredation problems in the WV-LCR and the need for balance in addressing these problems in ways that maintain the benefits of geese to a larger number of consumptive and noncomsumptive users throughout their range. The intent is to increase awareness among all affected interests, particularly Oregon and Washington landowners and Alaskan native subsistence hunters, concerning the needs of all user groups, with a primary focus on achieving population management objectives for all Canada geese wintering in the WV-LCR.

9. **Funding and Implementation Objective**: Reduce agricultural depredations in the WV-LCR by increasing funding for Canada goose management activities and implementing all facets of the depredation plan. The approach will be to gain public acceptance of both the problem and the need for government action to address the problem in a constructive fashion such that the public at large will support increased expenditures for goose management.

INTRODUCTION

Goose management in NW Oregon and SW Washington is one of the most complex wildlife issues in North America. Seven subspecies of Canada geese are found in the region during the fall and winter. Nowhere else in the United States are so many different subspecies of Canada geese mixed together on wintering grounds. These geese are an important natural resource to many diverse constituencies throughout the coastal States and Provinces of the Pacific Flyway. These geese are also the cause of increasing problems, primarily agricultural depredations, in this major wintering region of the Pacific Flyway. Management agencies are striving to achieve a balance between maintaining healthy, natural populations of all subspecies of migratory Canada geese without adversely impacting other human uses, particularly agricultural interests. Unfortunately, the population status of some subspecies is below Pacific Flyway objective levels (i.e. Aleutian, dusky, and cackling Canada geese) while other populations are healthy and growing. The differing status of the populations results in a complex management problem that is the subject of this management plan.

As the total number of Canada geese wintering in the Willamette Valley-Lower Columbia River (WV-LCR) region of NW Oregon and SW Washington has increased, so have agricultural depredation complaints. Federal and state agencies have worked with landowners to address depredation concerns. However, the scope and severity of landowner complaints has greatly increased in recent years. A coordinated resource management plan dealing with agricultural depredation problems in the region was cooperatively written by a team of private landowners and state/federal agency personnel in 1990. Two additional landowner groups also worked during 1994 and 1995 to develop additional recommendations to address agricultural depredation issues.

This plan was developed at the request of the Pacific Flyway Council (PFC) (March 16, 1997, recommendation no. 18). The PFC requested that the U.S. Fish and Wildlife Service (USFWS) help coordinate the development of a plan to address the goose depredation issue in NW Oregon and SW Washington. As part of this effort, federal and state wildlife managers and Farm Bureau representatives from Oregon and Washington formed a collective group to provide guidance and input to this plan (see Appendix A for description of management agencies and farm bureaus). The participation of the various agencies and organizations should not be interpreted as complete endorsement of all the specific details contained in the plan. This plan focuses on issues surrounding agricultural, not urban depredation and nuisance problems associated with geese.

The primary purpose of this plan is to reduce agricultural depredation in the WV-LCR while maintaining population objectives for Canada geese in the Flyway. The PFC recommended seven specific topics to be addressed in the NW Oregon/SW Washington depredation control plan. These topics were: (1) depredation research needs, (2) optimal Wildlife Services (WS) - formerly Animal Damage Control - staffing levels, (3) habitat management on public lands, (4) acquisition and management of additional habitat, (5) hunting season structure, (6) use of kill permits and (7) funding mechanisms. In addition to addressing the topics recommended by the PFC, the working group recommended that a total wintering Canada goose population and public outreach program objectives be included. Under each of these main topics, goals, objectives and strategies have been developed.

After completion of a public review period and PFC adoption, implementation of this 5 year plan will begin. However, strategies identified during development that can be addressed sooner will be implemented as opportunities arise and when there is consensus that such strategies are desirable. This plan is intended to complement existing Pacific Flyway Management Plans (Appendix B) and agreements that guide the cooperative management programs for the seven subspecies of Canada geese throughout the Pacific Flyway. No part of this plan is intended to alter any aspect of these existing management plans and agreements. The responsible management agencies will work to resolve any conflicts between objectives

contained in the referenced Flyway Management plans in a timely manner.

PROBLEM STATEMENT:

The total goose population in the WV-LCR has increased to the point where damage caused by geese has adversely affected a large group of land owners who have suffered substantial agricultural losses. Concurrently, certain subspecies of Canada geese present in the area, including the cackling and the dusky Canada goose, are below desirable population levels. Contributing to the complexity is the fact that while cacklers are below population objectives they are the most abundant subspecies in the area. The challenge is to reduce depredation losses caused by geese in the WV-LCR while maintaining the various goose populations at Flyway objective levels.

AREA DESCRIPTION

This plan will be implemented in the WV-LCR area of NW Oregon and SW Washington (Fig. 1).

Willamette Valley:

Oregon - All of Clackamas, Washington, Yamhill, Polk, Marion, Linn, Benton and Lane counties.

Lower Columbia River:

Oregon - All of Clatsop, Columbia and Multnomah counties.

Washington - All of Clark (except the area south of the Washougal River), Cowlitz, Wahkiakum and Pacific counties.

BACKGROUND

The following information provides background and history on issues related to Canada goose management and agricultural depredation. This information is provided to increase public awareness regarding the complexity of the goose management problem and reduce conjecture surrounding the status of subspecies.

Canada Goose Taxonomy

The Pacific Flyway continues to recognize the subspecific classification of Canada geese as described by Delacour (1954). This classification recognizes seven distinct subspecies of Canada geese within the Pacific Flyway: cackling (*Branta canadensis minima*), Aleutian (*B.c. leucopareia*), Taverner's (*B.c. taverneri*), lesser (*B.c. parvipes*), dusky (*B.c. occidentalis*), Vancouver (*B.c. fulva*), and western (*B.c. moffitti*). All of these subspecies are known to occur in the WV-LCR. Identification of subspecies is based on a series of measurements of geese from specific breeding areas throughout the Pacific Flyway (Johnson et al. 1979). Additional information from ongoing genetics studies, band recovery data, and morphological characteristics obtained from breeding birds (including breast color obtained from the Copper River Delta, Alaska) are being incorporated into these determinations as information becomes available.

The recognition of subspecies in Canada geese is not consistent among authorities and several alternative classifications have been proposed. Palmer (1976) recognizes only eight subspecies across North America and combined the dusky and Vancouver subspecies of Delacour (1954). Sibley and Monroe (1990) do not recognize the dusky as a separate subspecies, either. However, Delacour (1951), Johnsgard (1975) and Johnson et al. (1979) all recognize twelve, including one extinct subspecies and it is this classification that is most widely employed by North American waterfowl managers.

Canada Goose History in the WV-LCR

Before the 1960's, the wintering Canada goose population of WV-LCR averaged fewer than 25,000 geese and most of these were the dusky Canada goose subspecies. Sport harvest of the dusky was relatively high and was concentrated on a few privately owned areas in the mid-Willamette Valley (Timm et al. 1979). During the 1950's, the need for refuges to protect the dusky was recognized and beginning in 1964, the first of three federal refuges was developed to provide wintering habitat for the dusky Canada goose. By the end of 1965, a 10,609 acre, three refuge complex was created

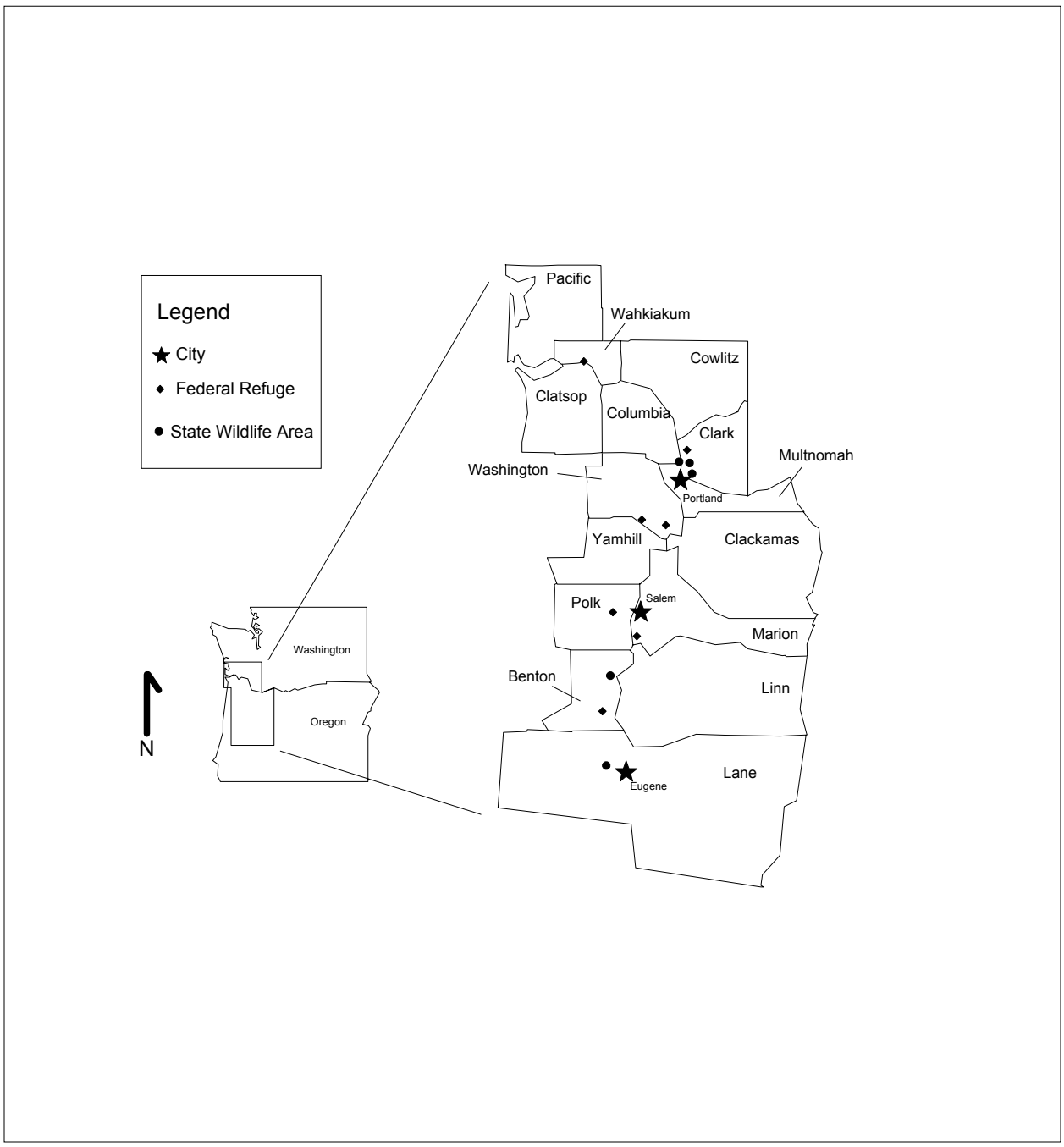

Figure 1. County map of the Willamette Valley - Lower Columbia River Region.

in the mid-Willamette Valley. In addition, the 5,149 acre Ridgefield refuge in SW Washington was created in 1965, to provide wintering habitat for the dusky. To attest to the effectiveness of the refuges, from 1963 to 1969, the post hunting season population of the dusky increased substantially from approximately 14,000 birds to over 23,000 (Timm et al. 1979). This occurred despite a daily bag limit of three geese (except 1967 and 1968) and seasons that extended as late as January 12.

The dusky population, however, began declining about 1979, with an accelerated drop in the mid-1980's (Fig. 2). The decline is attributed to several earthquake-related ecological changes on Alaska breeding grounds nesting habitat, combined with excessive harvest on the wintering grounds. The duskys behavior appears to make it more vulnerable to sport harvest (Simpson and Jarvis 1979).

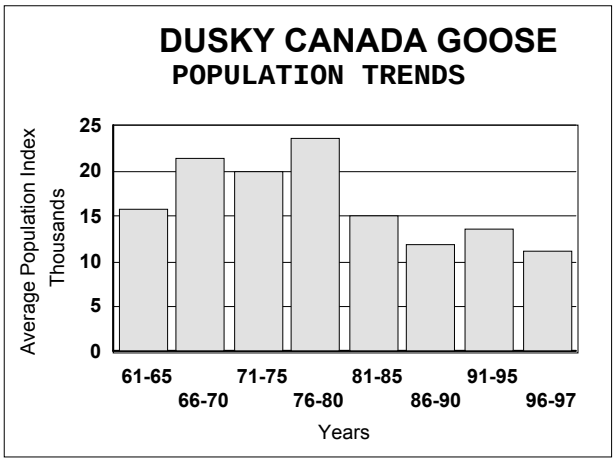

Figure 2. Dusky Canada goose 5 year population trends, 1961 - 1997.

Hansen (1962) described the breeding range of the dusky Canada goose as extending from the Bering Glacier to the Cook Inlet, a distance of about 275 air miles with the population reaching its greatest abundance on the Copper River Delta (CRD), near Cordova, Alaska. More recent studies classify Cook Inlet geese as lessers and more narrowly delineate duskys to the CRD. However, the taxonomic identity of some groups of geese breeding near the CRD is still in doubt. There are small, unsurveyed groups of large, dark Canada geese breeding in the forested habitats of Prince William Sound, adjacent to the CRD to the west, and eastward along the Gulf of Alaska, but they are widely dispersed and not numerous. The extent to which these geese migrate south and may confound winter inventories of dusky geese is unknown and warrants study of their taxonomic identities and winter distribution.

Before 1964, the low elevation of the CRD and periodic flooding during high tides maintained broad expanses of sedge meadow dissected by a reticulated pattern of drainage channels and sloughs. A mixed forb/low shrub community was found only on slightly elevated slough banks (Trainer 1959). Brackish conditions significantly influenced productivity of waters and controlled the composition of plant communities. Early surveys (Trainer 1959) showed that dusky geese selected mixed forb/low shrub nest sites and that flooding was the primary cause of relatively infrequent nest losses. Nest predation by gulls was slight and mammalian predators were considered rare on the outer delta. Overall, nest success was high.

In March, 1964, the "Good Friday" earthquake uplifted the CRD by 1.9 meters. This change drastically altered the frequency of flooding, reducing the extent of tidal inundation and promoted drying of slough banks and meadows (Reimnitz 1972). The drier conditions and lack of suppression by saltwater have allowed the invasion and growth of shrubs such as alder and willow. Between 1974 and 1984, shrub cover has increased nine-fold on the coastal delta (Campbell 1990).

The effects of habitat changes on dusky Canada goose production are not fully known. Nesting geese have apparently adjusted to changes in vegetation physiognomy and composition, and are using the drier, shrubby habitats extensively (Bromley 1976, Campbell 1990). The secondary effects of habitat change may be more significant. The species composition of predators on the delta has changed (Campbell and Griese 1987) and nest predation has sharply increased. Avian predators still destroy nests, however, predation by coyotes (*Canis latrans*) and brown bears (*Ursus arctos*) has become prevalent. In part, this is attributed to the increase in tall shrub habitats that are preferred by the large mammalian predators.

During the 1980's, predation by brown bears and coyotes was significant as shrub habitats became more extensive. Since then, a wide variety of avian predators, including bald eagles, ravens, and gull species have joined the suite of predators taking eggs, goslings and adult birds. Concurrent to the change in predator species' numbers and diversity, nest predation increased from less than 6% in 1959 (Trainer 1959) to an average of over 55% during the 1980's and an average of over 60% in the 1990's. Consequently, production has dropped dramatically. Continuing poor production has not only resulted in a population decline, but has also lead to an unfavorable age structure in the dusky goose population. A population model developed by the Alaska Department of Fish and Game (unpublished data) suggests that nearly 60% of the population likely exceeded 7 years of age in 1990.

Beginning in the late 1970's, the number of Taverner's Canada geese wintering in the WV-LCR increased from 2,000 to more than 60,000 (Simpson and Jarvis 1979, Jarvis and Cornely 1988). This increase occurred despite the liberal goose hunting season. Reasons for this increase are unknown. During this period, wintering Taverner's geese exploited new refuges in the northwest region and gradually remained north of their traditional California wintering areas.

The Taverner's Canada goose nests in a broad belt of tundra bordering the western and northwestern coast of Alaska (Johnson et al. 1979). Primary nesting areas include Bristol Bay, the outer Yukon-Kuskokwim Delta (Y-K Delta), Seward Peninsula, Kotzebue Sound/Selawik Lowlands, Upper Noatak River and several disjunct areas of the Alaskan North Slope. Unlike the dusky, the Taverner's nests are widely dispersed so that it is difficult to monitor nesting success and production. Because of its widely dispersed nesting pattern, this bird is not subject to significant subsistence harvest or concentrated predation. It is a wary bird and difficult for hunters to harvest.

Along with the buildup of the Taverner's population, numbers of the resident western Canada goose also increased steadily during the 1970's and 1980's, with significant increases between 1985-90 (Fig. 3). Also known as the Great Basin Canada goose, this is the only goose that nests in Oregon and Washington and can be found breeding throughout both states (Krohn and Bizeau 1980). Over the long term, westerns have been increasing in Oregon and Washington. The wintering population is made up of both resident and migrant birds. Estimated annual survival rates for westerns in the WV-LCR is 64% (ODFW unpubl. data 1995). Population change is a function of both survival and recruitment rates and western Canada geese seem to enjoy fairly high and consistent recruitment coupled with moderate survival leading to steady population growth.

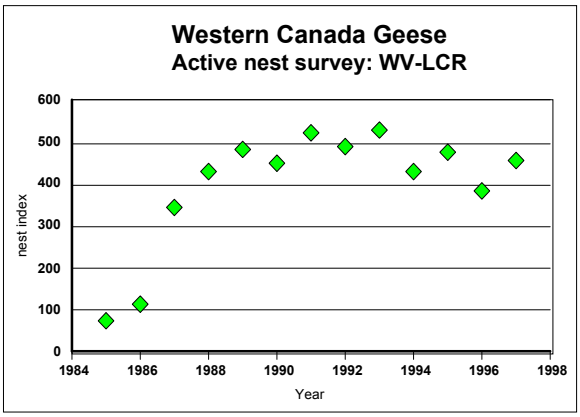

Figure 3. Lower Columbia River western Canada goose active nest survey, 1985 - 1997.

The smallest of Canada geese, the cackling Canada goose, like the dusky, also experienced a sharp decline throughout the Pacific Flyway during the late-1970's and early 1980's. The "cackler" nests in a narrow fringe along the western coast of Alaska, between the Yukon and Kuskokwim Rivers and has traditionally wintered in the Central Valley of California with a few wintering in Oregon. Numbers dropped from an estimated 400,000 in the late 1960's, to fewer than 25,000 in the mid-1980's. The decline is believed to be largely due to sport harvest in California and subsistence harvest on the Y-K Delta in Alaska (Raveling 1984). The hunting season for this subspecies was closed beginning in 1984. While recreational harvests were being reduced through various restrictive measures, efforts were also underway to reduce subsistence hunting taking place on the Y-K Delta. In 1984, the Y-K Delta Goose Management Plan was cooperatively developed

and implemented by management agencies and user groups throughout the flyway to enhance protection of cacklers, brant, white-fronted geese and emperor geese and restore these populations (Pamplin 1986). Substantial moderation of spring harvest of both eggs and geese and increased protection during fall and winter were accomplished as a result of this plan, further protecting the cackler population.

In 1993, the cackler fall flight was estimated at 164,000 birds (Fig. 4), which allowed the population to reach the minimum flyway harvest objective of 110,000. In recent years the cackler population has continued to increase at a rapid rate, warranting a reopening of the cackler season, beginning in 1994. Along with the current buildup, there is a significant increase in the proportion of birds wintering in the WV-LCR with a proportional decrease in California (R. E. Trost pers. commun.).

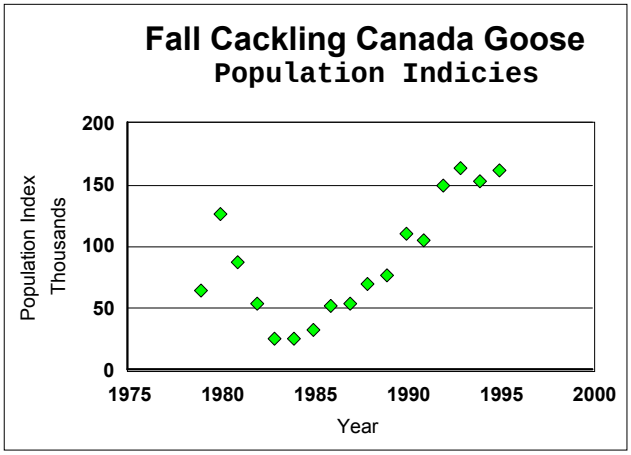

Figure 4. Cackling Canada goose fall population index, 1979 - 1995.

The wintering goose flock also includes smaller numbers of lesser and Vancouver Canada geese. Lesser Canada geese are similar in size and coloration to the Taverner's. The lesser nests from interior Alaska eastward into the Yukon Territory in a widely dispersed pattern and is not significantly affected by subsistence harvest or predation (Johnson et al. 1979, King and Hodges 1979). Some lesser Canada geese wintering in the WV-LCR originate from an urban goose population now numbering 5,000 birds in Anchorage, Alaska.

The Vancouver Canada goose is a large dark colored bird that closely resembles the dusky in appearance. The Vancouver nests along the forested coastline of southeastern Alaska and British Columbia (Lebeda and Ratti 1983). This bird is believed to be relatively non-migratory, with only a small percentage of the population wintering in Washington and Oregon (Hansen 1962, Ratti and Timm 1979).

Aleutian Canada geese, a federally designated threatened species number about 20,000. This subspecies nests on the Aleutian Islands of Alaska and primarily winters in the San Joaquin Valley of California. A small group of Aleutian's from the Semidi Islands winters along the Oregon coast. A few individuals associated with the wintering areas in California have been observed in the WV-LCR. As this population increases, there is potential for this subspecies to increase in the WV-LCR region.

In summary, the midwinter Canada goose population index in the WV-LCR increased from around 40,000 to over 130,000 in the past 20 years (Fig. 5).

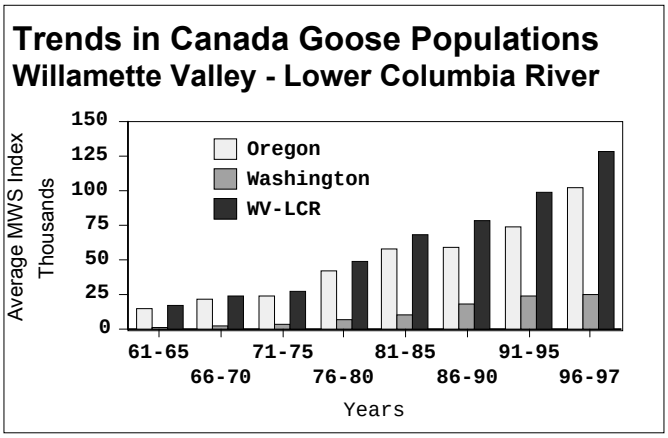

Figure 5. Northwest Oregon and southwest Washington Canada goose 5 year midwinter index, 1961 - 1997.

Restrictive harvest regulations are believed to have contributed to the increase in the total number of Canada geese wintering in the WV-LCR, both through increased survival and lowered disturbance. Major shifts in the

wintering distribution of two subspecies, Taverner's in the 1970's and cacklers in the 1990's have resulted in greatly increased numbers of Canada geese wintering in the region. This increase in total numbers of Canada geese has resulted in an increase in agricultural depredations and, correspondingly, landowner tolerance for geese on private lands has diminished.

PRIMARY GOAL OF THE DEPREDATION PLAN

Reduction of agricultural losses caused by depredating Canada geese is the primary goal of this plan. The following primary objectives of the plan describe how this will be accomplished while maintaining and/or enhancing goose populations Flyway wide. Each primary objective, although presented separately, should be considered as an integrated approach to Canada goose management in the region. The approach will be to utilize all the management tools available in concert and complimentary with one another to achieve the primary goal of the plan.

Primary Objective 1. WINTERING POPULATION OBJECTIVE FOR THE WV-LCR REGION

The establishment of a total Canada goose population management objective has been identified by the 1997 depredation working group as an essential component of this plan.

The primary method of population management for wintering Canada geese in the WV-LCR is harvest regulation. Concurrent with harvest regulation is the need for accurate population monitoring and assessment. Objectives for the wintering goose population in the WV-LCR must be consistent with: (1) recent population levels and trends, (2) the capacity of public and private lands to support goose populations without adverse impacts, (3) objectives for hunting, (4) landowner tolerance for goose use on private lands, and (5) Pacific Flyway population objectives.

Goal: To limit the number of Canada geese wintering in the WV-LCR in order to minimize agricultural depredations on private lands.

Objective 1: To limit the number of Canada geese wintering in the WV-LCR to no more than 133,000 (95-97 average midwinter population index) and reduce the number of wintering Canada geese by 20% to 107,000 (as measured by the midwinter index) by the year 2002. This plan recognizes that the actual number of Canada geese present in the region is greater than the index, however, this number is the only long-term, consistent measure of the population available and is therefor used for comparative purposes. The actual number of Canada geese is likely 2-3 times this number and the goal is to stabilize and then reduce both the index and the actual number by 20%.

Strategy: The initial focus of reduction efforts should be to increase harvest pressure on Canada geese through alterations to existing hunting seasons as proposed in this plan within Flyway management guidelines.

Rationale: This goal establishes a population limit of no further increase in the total number of Canada geese wintering in the WV-LCR area beyond the average number counted during the last 3 years (1995-97). Wintering Canada goose numbers are derived from the midwinter survey index. The midwinter index is the only long-term survey of Canada goose populations in the WV-LCR. This plan recognizes that the midwinter index does not provide a total population estimate but rather a consistent long-term index to changes in population size. Current evidence suggests that the index value is less than the actual number of Canada geese present.

Sport harvest will be given first consideration but other lethal means will be considered if harvest efforts are deemed ineffective at reducing total wintering Canada goose numbers. Other lethal means will be used on a limited basis to enhance the effectiveness of management tools outlined in this plan. Also, since cackling Canada geese represent a significant portion of

the wintering population, methods to redistribute cacklers back to wintering areas in California or changing Flyway population objective must be evaluated. However, past efforts to redistribute Canada geese in other parts of the country have proven to be ineffective (Rusch et al. 1985).

Objective 2: Delist the Aleutian Canada goose.

Strategy: The directors of ODFW, WDFW, ADFG and CDFG should facilitate discussions with Regions 1&7 of the USFWS to gain support and finances to begin the delisting process.

Rationale: This subspecies has recovered rapidly in recent years and the federal threatened status is no longer warranted. In 1996, delisting was recommended by the Aleutian Canada Goose Recovery Team and the Pacific Flyway Council. Although few Aleutian Canada geese were encountered in the WV-LCR area, options to deal with depredation issues will be increased, particularly with regard to harvest and depredation control activities, by delisting this subspecies.

Objective 3: Increase awareness among Oregon and Washington landowners and Alaskan subsistence hunters concerning needs of all user groups, with a primary focus on the cackling Canada goose population management and programs.

Strategy: As soon as feasible (1997-98), conduct a meeting between wildlife management agency personnel, private landowner representatives, hunting groups and native Alaskans to discuss cackling Canada goose management issues.

Rationale: Recent increases in the cackler population and a winter distributional shift from California to the WV-LCR has caused agricultural depredation problems to increase. The cackler population is approaching the proposed flyway management objective (Appendix B) and is heavily utilized by native Alaskans on the Y-K Delta for subsistence purposes, thus efforts to control the wintering population in the WV-LCR must be developed in concert with the needs of all user groups.

Primary Objective 2. POPULATION ASSESSMENT AND MONITORING

Attaining and maintaining population goals and habitat management programs depends on accurate monitoring of population size (Hindman and Ferrigno 1990). During recent years, waterfowl managers have attempted to work with about 30 identifiable populations of geese in North America (Nelson and Bartonek 1990). However, only a limited number of these populations are surveyed regularly, some not at all. Some goose populations are surveyed on the breeding or wintering grounds or while in transit between breeding and wintering grounds. Appendix C details the types of surveys and banding programs conducted in the WV-LCR for Canada goose management purposes. The strategies listed under the population monitoring objectives were derived from flyway management plans described in Appendix B. These strategies pertain to population surveys and collar reading programs of wintering geese and breeding population surveys of resident Canada geese (western subspecies). These efforts will assist in achieving other goals of this plan and assess achievement of limiting the number of wintering Canada geese in the WV-LCR.

Goal: Develop and employ monitoring programs to accurately assess goose populations, distribution and survival rates of Canada geese on the breeding and wintering grounds.

Objective 1: Develop survey techniques to better assess the total wintering Canada goose population on the wintering grounds (WV-LCR).

Strategy: Continue the current midwinter survey (MWS).

Rationale: The current MWS provides an index to the total wintering Canada goose population in the WV-LCR. This survey is the only long-term index to Canada goose numbers and abundance throughout the area. To maintain comparability for assessment of the

management program, it is essential to continue the midwinter survey in its current form.

Strategy: Conduct additional aerial and ground surveys October - April to acquire data on the total wintering Canada goose population and distribution of subspecies in the WV-LCR.

Rationale: Improved survey methodologies developed specifically to estimate total Canada goose numbers and distribution throughout the area will assist managers in evaluating impacts of management actions and help to focus management programs on those geographic areas with the highest goose densities and/or most depredation damage. The development of a scientifically rigorous survey that employs transect designs and variance estimation techniques would provide a better estimate of the total wintering Canada goose population (Martin et al. 1979) than is presently obtained from the midwinter survey.

Objective 2: Continue to use mark-resight surveys to determine population size, distribution and survival of Canada geese wintering in the WV-LCR.

Strategy: Periodically conduct banding and collar marking of dusky Canada geese on the CRD, cackling Canada geese on the Y-K delta, western Canada geese in the WV-LCR and lesser Canada geese in Anchorage and other known breeding areas, where feasible. Continue observation effort in the WV-LCR.

Rationale: Use of mark-resight data has been proven to be effective in providing reliable information regarding effects of restrictive harvest regulation changes on survival and recovery rates for Canada geese (Hindman and Ferrigno 1990). Data from neck collaring provides timely and reliable information that can be collected to reflect distribution outside the hunting season or in areas where hunting is not allowed. To support indirect winter population estimates, distribution studies and research objectives outlined in the dusky, cackler and Taverner's/lesser Canada goose management plans, neck collaring programs should be conducted on these four subspecies.

From 1990 to 1994, several thousand western Canada geese were neck collared in the WV-LCR to determine population size, distribution and survival. Previously unknown information regarding distribution patterns (movement) was gathered from that effort. A new neck collaring program should be evaluated for this subspecies.

Objective 3: Maintain and continue to refine breeding ground surveys of dusky and cackling Canada geese.

Strategy: Continue the aerial transect surveys on the Y-K Delta and CRD in Alaska to monitor populations of cackling and dusky Canada geese.

Rationale: These surveys provide population specific information on these goose populations at a time when they are geographically separated and relatively sedentary on their principle breeding grounds. Such surveys offer the best long term opportunity to accurately monitor these populations.

Objective 4: Evaluate the development of additional breeding ground surveys to monitor population trends of Taverner's and lesser Canada geese.

Strategy: Conduct experimental, fixed wing aerial transect surveys throughout the breeding range of these subspecies to determine the feasibility of a periodic operational survey to monitor populations.

Rationale: The large number of subspecies wintering in the WV-LCR region makes monitoring individual subspecies through aerial surveys a difficult, if not impossible, means of monitoring these populations. The development of a comprehensive breeding population survey program for all Canada goose populations would greatly facilitate population management.

Primary Objective 3. HABITAT MANAGEMENT AND PUBLIC USE

Quality habitat for wintering geese is critical and more important than often realized. Winter is the time for geese to form pair bonds, recharge body reserves in preparation for spring migrations and breeding and survive hunting pressure and highly variable weather conditions (Hartman 1995). On the wintering grounds geese prepare for their next breeding season by acquiring important reserves of lipids and proteins necessary for migration to northern breeding grounds and successful reproduction (Raveling 1979). If the birds do not acquire the necessary nutrients by the time they arrive on the breeding grounds, their reproductive efforts may be diminished.

Winter food acquisition by Canada geese is a complex interaction of nutritional needs, resource availability, habitat quality and behavior (Baldassarre and Bolen 1994). Habitat management for Canada geese requires providing three essential elements, food, water, and sanctuary, to sustain geese from arrival in fall (October) to departure in spring (late April). Food, in the form of grasses (green forage), grains, and natural vegetation, should be provided proximate to open water for successful habitat management. Canada geese prefer to graze on short (< 4 inches) grasses. Also known as green forage, various types of grasses and grass-legume mixes comprise the majority of the diet of geese in the WV-LCR.

Wildlife refuges and wildlife areas are vitally important wintering areas for Canada geese. These areas provide considerable goose food resources and human activity (disturbance) is usually regulated. Goose habitat management efforts are geared to maximize (dependent upon personnel and funding) food production. Practices include creating, enhancing or restoring wetlands to provide natural (moist soil) vegetation, planting and flooding of managed areas, and providing agricultural crops and pastures. In addition, portions of these areas provide sanctuary from human disturbance.

Sanctuaries on public lands that provide foraging and roosting areas free from human disturbance are essential for successful Canada goose management and would help alleviate depredation on private lands. Sanctuary area benefits can be attained through a combination of spatial and temporal areas that are maintained essentially or totally free from all human disturbance. Effects of disturbance from hunting, vehicle and foot traffic, viewing, management or research activities can lead to change in habitat use, behavior and food habits. Fredrickson and Drobney (1979) cited depletion of energy reserves, delay of migration and pairing, and elimination of wintering traditions as possible consequences of disturbance. Continued disturbance of wintering Canada geese on public lands could potentially increase agricultural depredation of surrounding private lands.

Public access on Federal refuges and State wildlife areas varies greatly. The type and level of regulated public use is determined by the compatibility of that activity with the goals and objectives of the individual refuge or wildlife area. Some of the major public use activities that occur on refuges and wildlife areas include hunting, fishing, bird watching, hiking, photography, dog training, and environmental research and education.

Public Lands - Federal and State

Ten Federal National Wildlife Refuges (NWR) (Willapa, Ankeny, Baskett Slough, Julia B. Hansen, Lewis and Clark, Ridgefield, Steigerwald Lake, Tualatin River, Wapato Lake and William L. Finley), three state of Oregon (E.E. Wilson, Fern Ridge and Sauvie Island) and two state of Washington (Shillapoo and Vancouver Lake) wildlife areas lie within the WV-LCR Region of NW Oregon and SW Washington. Existing habitat management and public use programs are mandated by established policies and/or approved management plans.

Federal Lands

The USFWS administers approximately 60,000 acres within the goose depredation area; however, not all of this area is capable of

providing habitat suitable for Canada goose management. The USFWS provides agricultural habitats on some of the refuges through cooperative farming agreements with local landowners.

Western Oregon NWR Complex (Ankeny, Baskett Slough, Tualatin River, Wapato Lake and William L. Finley)

Ankeny, Baskett Slough and William L. Finley NWR's were initially established in the mid-1960's to provide wintering habitat for the dusky Canada goose. Ankeny NWR is located near the town of Jefferson, Baskett Slough NWR is located near the town of Dallas and the William L. Finley NWR is located near Corvallis. These three Willamette Valley refuges encompass approximately 10,613 acres, of which over 5,000 acres are farmed to provide winter feed for geese (Appendix C).

Under the cooperative farming program on Ankeny, Baskett Slough and Finley NWRs, farmers plant grass, pasture and grains and then harvest all of the grass seed. All of the forage provided by these crops is available to wintering waterfowl during the fall-spring period. The farmers harvest grass seed and hay from these areas during the summer, after the geese have migrated north to their breeding grounds. Cooperative farming agreements on other NWR's vary, but generally allow the farmer to remove a significant portion (75%) of the crop while leaving a small portion (25%) of the harvest behind for foraging geese. The three main crops planted on the NWR's are annual ryegrass, perennial ryegrass, and fescue. In recent years, these refuges have also been developing several hundred acres of moist soil units which have also been heavily used by geese.

Wildlife observation, photography, hiking, hunting, interpretation and environmental education are the major public use activities on the refuges. Large portions of Ankeny, Baskett Slough and Finley NWR's are closed to public access when the geese arrive in the fall and remain closed until geese migrate out of the area in the spring. This closure includes all wetlands and green forage areas utilized by geese. The public can drive through the refuges along county, state or federal main roads, but are instructed to stay in their vehicles except at designated viewing areas. The refuges were open to public waterfowl hunting until 1985 at which time they were closed due to the low midwinter index of duskys and the disturbance that resulted from hunting. Refuge staff and farming activities are also minimized during the winter to reduce disturbance to geese. Visitors are allowed access throughout the refuges during the summer months.

Established in 1992, the Tualatin River and Wapato Lake NWR's are located in the north end of the Willamette Valley and currently total 913 acres with an approved future boundary of 3,166 acres. Although small in size and largely undeveloped for refuge purposes, these two refuges could provide significant wintering goose habitat in future years. All public access on Tualatin River and Wapato Lake NWR's is prohibited at this time.

Ridgefield NWR Complex (Ridgefield and Steigerwald Lake)

Ridgefield NWR is located 20 miles north of Portland along the Columbia River near the town of Ridgefield in SW Washington. This 5,149 acre refuge was established in 1965 to provide a wintering area for migratory waterfowl, especially dusky Canada geese. Farming on the refuge is through a cooperative farming program and limited cattle grazing occurs on the area. Steigerwald Lake NWR is located along the Columbia River in eastern Clark County near the town of Washougal. This 900 acre area was initially established in 1984 to serve as a wintering waterfowl area and provides approximately 150 acres of goose foraging habitat. No farming program exists for this refuge.

Major public use activities on Ridgefield NWR include waterfowl hunting, wildlife observation and photography and environmental education. Public entry onto the refuge varies by management units (River S, Roth, Bachelor and Bridgeport Dairy). Portions of the River S unit are closed to all public use from October 1 - April 15. The remaining portion is open to hunting only on waterfowl hunt days. The Bridgeport Dairy and Bachelor units are closed

year-round to all public use, with the exception of vehicle use along the lower River Road. Public use on Steigerwald Lake NWR is prohibited except for group tours conducted by refuge staff.

Lower Columbia River NWR's

The Julia Butler Hansen and the Lewis and Clark NWR's are collectively known as the Lower Columbia River NWR's for purposes of this plan. The Julia Butler Hansen NWR is located near the town of Cathlamet, Washington, and encompasses approximately 5,516 acres. This refuge was established in 1972 for the protection of the endangered Columbia white-tailed deer. The 38,214 acre Lewis and Clark NWR was established in 1972 for the purpose of providing habitat for migratory birds, primarily waterfowl. Currently, the farming and grazing programs on the two refuges are geared towards providing green forage for white-tailed deer and wintering waterfowl.

The Julia B. Hansen NWR is open daily on a year-round basis, from dawn to dusk. Public entry on the mainland unit is limited to foot travel on the Center Road. Public entry on Tenasillahe Island is limited to foot traffic on the dike. These restrictions are in place to protect the endangered Columbia white-tailed deer from disturbance. Major public use activities include wildlife observation, hiking, hunting, sport fishing and environmental education.

The numerous islands of the Lewis and Clark NWR are accessible only by boat. As a result, the major winter public use activity is waterfowl hunting. But fishing and boating activity can increase in March. All lands are open to waterfowl hunting except all dikes, all exposed lands on Miller Sands and its partially enclosed lagoon and the diked portion of Karlson Island. The refuge is open to day use only.

State Lands:
Oregon: Sauvie Island Wildlife Area

Established in 1948 as a wintering waterfowl area, the Sauvie Island Wildlife Area is located at the confluence of the Columbia and Willamette Rivers. This 12,000 acre area is located 10 miles from downtown Portland and approximately 4,359 acres are currently available for goose food production. Most of the farming is conducted by ODFW personnel, with some limited sharecropping occurring.

With the location so close to the Portland metropolitan area, the Sauvie Island Wildlife Area is very popular with the public for outdoor related activities. The most popular public use activities include swimming and beach activities and fishing which together account for 65% of all recreational use. Public access restrictions vary among management units, but generally call for areas to be closed to public access (except for designated hunting seasons) from October 1 through February 1(Stillman Lake and Oak Island), March 15 (Seal Lake and Mud Lake Units) and April 15 (Eastside and Crane Units and Sturgeon Lake). The Columbia River beaches and the North Unit are open year-round. Public hunting (waterfowl, upland bird, deer and dove) is a traditional use on the wildlife area and is an objective for the area.

Fern Ridge Wildlife Area

Fern Ridge Wildlife Area is located 7 miles west of Eugene adjacent to the Fern Ridge Reservoir. This 5,103 acre area was established in 1957 and has approximately 150 acres of cropland that are annually planted and 450 acres of moist soil impoundments are actively managed for waterfowl forage by ODFW personnel. Area lands are leased by ODFW from the U.S. Army Corps of Engineers for the purpose of wildlife management.

The majority (85%) of the Fern Ridge project land and water areas is open to public access year-round. Seasonal restrictions (Nov. 1 - March 30) to public access on the Fisher Butte, East Coyote and West Coyote Units are in place to protect wintering waterfowl. Major public use activities include hunting, fishing and boating related activities. Waterfowl, upland game birds, dove and deer hunting occur on the wildlife area.

E.E. Wilson Wildlife Area

E.E. Wilson Wildlife Area was acquired from the U.S. Army in 1948, after the Camp Adair Military Reservation was closed. This 1,683 acre area

has primarily served as a pheasant propagation facility, however, beginning in 1997, the propagation program was targeted for closure due to budget cuts by ODFW. E.E. Wilson Wildlife Area contains numerous fallow grassland fields that could potentially be farmed for goose forage. This farming would be contingent on either an increase in operating dollars for the wildlife area, or developing cooperative farming agreements with local farmers. In an effort to provide goose forage in the mid-Willamette Valley, wildlife area staff planted 30 acres of goose forage in 1996. However, to date no wintering Canada goose use has been recorded (Dave Budeau pers. commun.). In addition, since 1993 approximately 170 acres of seasonal wetlands have been restored on the area.

The E.E. Wilson Wildlife Area is open to public access on a year-round basis, except for several small designated areas. Major public use activities include viewing of upland game bird display pens, bird watching, hunting, fishing and hiking. Hunting for waterfowl, upland birds, rabbits and doves occurs on the area from September 1 through February 28, with upland bird hunting constituting a majority (60%) of the hunter visits.

Washington: Shillapoo and Vancouver Lake Wildlife Areas

Shillapoo and Vancouver Lake Wildlife Areas are located in Clark County in southwest Washington. This 1,549 acre area extends along the Columbia River floodplain from the city of Vancouver to the mouth of the Lewis River. Initial parcels of these wildlife areas were purchased in 1952 (Shillapoo) and 1960 (Vancouver Lake). WDFW has recently been expanding these areas through an extensive acquisition program in the Vancouver Lowlands in cooperation with Bonneville Power Administration (BPA) and the Washington Wildlife and Recreation Program. Approximately 880 acres of food crops and green forage are provided for wintering waterfowl through sharecropping agreements with local farmers.

Like the Sauvie Wildlife Area, the Shillapoo and Vancouver Lake Wildlife Areas are very popular due to their proximity to the Portland metropolitan area. The areas are open to public access on a year-round basis and major activities include upland game bird and waterfowl hunting, bird watching, mushroom and fruit picking. Non-wildlife oriented recreation is centered primarily around Vancouver Lake and the adjacent county park.

Habitat Management and Public Use - Objectives and Strategies

The following goals, objectives and strategies were developed by state/federal land managers in an attempt to bolster wintering Canada goose numbers on public lands and to assist with other management aspects of this plan.

Federal and State Lands
Habitat Management

Objective 1: To increase the amount of Canada goose use on public lands, while subsequently decreasing the amount of Canada goose occurrence on private lands.

Strategy: Reduce time period of pheasant hunts to reduce disturbance of geese using these areas during late winter and spring.

Strategy: Restrict public access for all purposes during late winter and early spring.

Rationale: Disturbance on public lands may contribute to agricultural crop depredation problems by displacing geese from public to private lands. To the extent possible, it is recommended that such disturbance be reduced or eliminated beginning with the end of the duck hunting framework (Sunday closest to 20 January) and continuing through 15 April to enhance public lands for attracting and holding geese.

Objective 2: Review habitat management programs on refuges and wildlife areas to develop programs to increase and improve goose forage.

Strategy: Conduct an annual meeting with landowners to discuss management of public lands with a focus on Canada geese.

Rationale: Investigation and development of alternative farming techniques is vital to maximizing goose food production on public lands. Current farming programs successfully provide quality forage for wintering geese; however, the quality and quantity of forage may be increased by implementing alternative farming strategies or altering existing habitats that are deemed unproductive for wintering goose forage. Bringing local farmers and refuge and wildlife area staffs together to discuss farming practices on public lands to increase goose use is an important task. In addition, this meeting would provide the opportunity to discuss recent wetland restoration efforts on state and federal lands.

Strategy: Review farming, livestock grazing and wetland management programs on all NWR's and wildlife areas to provide increased goose use, with a goal of increasing use by dusky Canada geese.

Rationale: Farming, grazing and wetland restoration/enhancement efforts will be reviewed to determine their compatibility with providing wintering Canada goose habitat and to identify possible program modifications to maximize goose use on each refuge.

Public Use

Objective: Decrease disturbance to wintering Canada geese and increase goose use of public lands by implementing public use restrictions.

Strategy: Increase public education efforts concerning Canada goose management in the WV-LCR.

Rationale: Management problems including agricultural depredation associated with wintering Canada geese in the WV-LCR are little known outside the farming and scientific communities. An increased education effort directed toward visitors to refuges and wildlife areas is recommended. Updated information kiosks and literature detailing goose management including agricultural depredation problems in the WV-LCR and the role of refuges and wildlife areas are proposed.

Strategy: Review all public use programs on all NWRs and wildlife areas to reduce disturbance and increase goose utilization.

Rationale: A number of studies have shown that human disturbance can be an important factor affecting goose feeding distribution (Owen 1972, Madsen 1985, Percival 1993). Recurrent disturbance of goose foraging and sanctuary areas on public lands could create agricultural depredation problems on surrounding private lands. All current public use programs should be reviewed to determine their compatibility with providing wintering Canada goose sanctuary and identify possible program modifications to maximize goose use on each refuge.

Federal Lands
Western Oregon NWR Complex
Habitat Management

Strategy: Continue wetland restoration programs in conjunction with established forage areas. Recent wetland restoration efforts have increased goose utilization of refuges and priority should continue to be placed on converting areas of low goose use to wetlands.

Rationale: Since 1992-93, USFWS refuge staff has closely evaluated goose utilization of individual crop fields and wetlands. Croplands which have produced unacceptable results, both in regards to yields and low utilization by geese, have been converted to other uses. Some fields that received little goose use were converted to moist soil wetlands, where millet, smartweed and other natural plants were encouraged. These changes were made with the overall objective to increase goose use of these areas. Preliminary results indicate that goose use has greatly increased in these areas. Fields that received little use before wetland conversions are now the most highly used areas on the refuges. Additional wetland restoration efforts are planned to further increase goose use on the Willamette Valley refuges.

Strategy: Increase capability to manage wetlands and croplands with enhanced water supplies.

Rationale: Additional refuge water supplies could enhance both wetland and cropland

habitats for Canada geese by providing the capability to irrigate and thus, produce a greater amount and higher diversity of goose food. The drilling of wells and/or obtainment of additional water rights/delivery on these refuges should be pursued in order to increase the management capability for Canada geese.

Strategy: Review and evaluate experimentation with alternative crops.

Rationale: The refuges have experimented to some degree with alternative crops, primarily pasture mixes, and the results have been positive (Jim Houk pers. commun.) by maintaining high goose use and reducing the amount of fertilizer and herbicides used for growing grass seed. Pastures comprised of both grasses and legumes seem to be highly used by Canada geese throughout the wintering season. The refuges will continue to explore the use of providing alternative crops for Canada geese including pasture, timothy, trefoil, etc. There are limitations associated with all of these crops including the interest/capability to grow them by refuge cooperative farmers. Crops that have a higher sustainability during the winter months will be a priority. Some grain crops, such as corn may be attractive to geese but last for shorter periods of time.

Strategy: Increase forage enhancement practices associated with the crop program.

Rationale: The refuges have seen higher goose use in fields that are fertilized and limed at a higher rate than those that receive these treatments infrequently. The refuge will require all cooperative farmers to conduct these treatments at sufficient times/rates in order to receive better sustained goose use.

Strategy: Increase burning of grass fields.

Rationale: The refuges have observed increased goose use of some grass fields that are burned compared to those that are not. The refuges would attempt to increase the use of prescribed fire as a goose management practice. However, it is well known that field burning in the Willamette Valley is a controversial practice and is tightly regulated by state and federal agencies.

Strategy: Increase Integrated Pest Management (IPM) program.

Rationale: The presence of noxious weeds (blackberry, tansy, leafy spurge, Canada thistle, knapp weed, purple loosestrife, etc.) within and adjacent to refuge farm fields reduces the quality of these areas as producers of Canada goose food. The refuges propose to increase IPM program efforts to reduce noxious weeds.

Strategy: Provide adequate composition of the major grass types used by Canada geese.

Rationale: The refuges have observed what appears to be seasonal variation in goose use among the three major grass crops (annual ryegrass, perennial ryegrass and fescue). Each of these high-protein crops vary in palatability for geese. In general, geese prefer the annual ryegrass during the fall, and gradually switch toward the perennial ryegrass and fescue in the winter (W. OR. Refuge Complex unpubl. report). It is the annual ryegrass that is much more susceptible to depredation concerns than other crops. However, all three of the refuges do not provide adequate amounts of all three grass crops. The refuges will ensure that all three grass types are adequately represented on each area.

Strategy: Increase experimentation with use of grazing of grass crops in late winter/early spring.

Rationale: During the late winter/early spring periods, grass height on some of the refuge fields begins to increase such that it actually becomes less desirable as possible goose forage. The refuge proposes to experiment with grazing of grass crops at this time of year in order to determine if it would increase its desirability by geese. There is recognition that this practice could affect grass seed production and would be a major concern of refuge cooperative farmers.

Strategy: Develop 500 acres of wetland and 200 acres of cropland habitats on Tualatin River NWR.

Rationale: To provide additional Canada goose wintering habitat on public land in the northern Willamette Valley, the USFWS, Bureau of

Reclamation and Ducks Unlimited, are partnering to restore wetland habitat on lands within the newly established Tualatin River NWR. In addition to these wetlands, croplands will also be managed for wintering waterfowl including Canada geese. As additional lands are acquired in the future, the refuge will continue to develop habitat for wildlife, including geese.

Strategy: Develop 90 acres of wetland habitat on Wapato Lake NWR.

Rationale: To restore wintering Canada goose use in the historic Wapato Lake Basin near Gaston in Yamhill/Washington counties and reduce agricultural depredation in the north Willamette Valley, the USFWS, Ducks Unlimited, and the Oregon Waterfowl and Wetlands Association will restore wetland habitat which will be managed primarily for wintering waterfowl, including Canada geese.

Ridgefield NWR Complex
Habitat Management

Strategy: Implement habitat improvements projects funded as part of the Lower Columbia River-North American Wetlands Conservation Act (NAWCA) grant.

Rationale: Rehabilitation of water supply and distribution systems on the River S Unit will allow for improved farming, grazing and wetland management capabilities, resulting in improved wintering Canada goose habitat and increased goose use of refuge lands.

Strategy: Implement farming and grazing modifications to provide green forage for Canada geese.

Rationale: The USFWS recently reviewed and evaluated the farming and grazing programs at Ridgefield NWR. It was determined that conversion from grain and clover cropping to green forage/pasture management would provide more sustainable foods for geese. This management scheme would result in more intensive management for geese and approximately 150 acres of additional goose habitat over past management. Improved pasture lands will be maintained by grazing, mowing and haying.

Lower Columbia River NWR's
Habitat Management

Strategy: Evaluate existing lands for additional goose foraging and wetland restoration opportunities.

Rationale: Cattle grazing of pasture areas can greatly benefit wintering Canada geese by stimulating growth of young succulent shoots. Grazing can be beneficial or detrimental depending upon the intensity, timing and duration of grazing of green forage areas. To maximize green forage production, alternative grazing strategies should be investigated to determine their effects on green forage production and subsequent use by wintering Canada geese. Creation and/or improvement of wetland areas also has the potential to increase the amount of use by Canada geese of these public lands.

Strategy: Develop suitable goose foraging habitats on sand disposal islands of the Lower Columbia River.

Rationale: Irrigation and soil amendments could possibly reduce the rate of wind erosion on sand spoil islands where revegetation efforts have failed. If successful, soil amended islands could be reseeded and would increase the amount of goose foraging areas along the lower Columbia River. Successful establishment of grass cover crops on these areas will require development of irrigation systems and regular fertilization.

Strategy: Investigate potential land exchanges with James River Corp., ODFW and USFWS to put lands in wildlife management for goose forage.

Rationale: The State of Oregon, USFWS, and James River Corp. all own small parcels of land along the Lower Columbia River that could be exchanged to provide additional wintering Canada goose habitat.

Currently, James River Corp. owns small land parcels that are unproductive for cottonwood growing, but would provide wintering goose

habitat. USFWS and the State of Oregon own small land parcels that do not provide goose habitat opportunities but could be used as cottonwood growing areas. Exchanging these land parcels would benefit all parties and provide additional wintering habitat for Canada geese along the lower Columbia River.

Oregon: Sauvie Island Wildlife Area
Habitat Management

Strategy: Begin grazing of Westside Unit green forage areas by March 1 of each year.

Rationale: To increase the availability and palatability of goose foraging areas on the Westside Unit, cattle grazing would begin on March 1. Currently, cattle grazing is initiated on March 15, if water levels are favorable. Extending the grazing period by two weeks will further enhance green forage areas, subsequently increasing goose use.

Strategy: Implement cattle grazing on 55 acre parcel of Oak Island to establish new goose forage area.

Rationale: Introduction of cattle grazing on portions of Oak Island would enhance the area for goose foraging use. Currently, the proposed area is unused by foraging geese due to the height and quality of the green forage area.

Strategy: Increase fall fertilizer application on all green forage areas.

Rationale: Application of fertilizer to green forage areas in the fall has been shown to significantly increase goose use, versus areas that receive no fertilizer treatments. It is believed that increased goose use is a result of increased biomass and protein content of fertilized green forage areas (Vickery et al. 1994).

Strategy: Implement habitat improvements projects funded as part of the Lower Columbia River-North American Wetlands Conservation Act (NAWCA) grant.

Rationale: Rehabilitation of water supply and distribution systems on the wildlife area will allow for improved farming, grazing, and wetland management capabilities, resulting in improved wintering Canada goose habitat and increased goose use of wildlife area lands.

Public Use

Strategy: Except for traditional hunting programs, close entire wildlife area (except Gilbert River access and Columbia River beaches) to public access from October 1 to April 15.

Rationale: The public use restrictions currently in place are managed on a unit by unit basis that calls for separate public use restriction dates within each unit. This proposal calls for all public use restriction dates to be uniform and extend to April 15. Implementing this strategy would decrease disturbance of wintering Canada geese by providing more sanctuary areas throughout the wildlife area for longer periods of time. The traditional program on the wildlife area is waterfowl hunting and this would be maintained.

Strategy: Close goose season concurrent with the closure of duck season.

Rationale: In an effort to decrease disturbance of wintering Canada geese, the area would be closed to public use from the end of duck season (mid-January) to April 15. This would call for the elimination of all step (unit by unit) closures that are currently in place and would close goose hunting at the end of duck season.

E.E. Wilson Wildlife Area
Habitat Management

Strategy: Continue farming of 30 acre experimental green forage area and review other potential developments for green forage.

Rationale: In 1996, a 30 acre green forage area was developed to provide food for wintering Canada geese. With increased funding or a cooperative farming program, a potential of 150 acres of goose foraging areas could be farmed on the area. Currently, this area receives little wintering Canada goose use.

Fern Ridge Wildlife Area
Habitat Management

Strategy: Implement diking project to increase availability of moist soil impoundments in the Fisher Butte Unit.

Rationale: Currently, portions of this area are dominated by reed canary grass and receive little goose foraging use. A proposed cooperative project between the U.S. Army Corps of Engineers, Ducks Unlimited, and ODFW would create wetland impoundments and install control structures, which would allow for year-round management of water resources. Creation of these impoundments would promote moist soil vegetation and subsequently increase goose use of the area.

Washington: Shillapoo and Vancouver Lake Wildlife Areas
Habitat Management

Strategy: Improve green forage areas by reseeding and increased weed control efforts.

Rationale: Research has shown that newly reseeded pastures can increase goose grazing density by 60-130% over unseeded pastures (Percival 1993). Some existing pastures on the wildlife areas have become unproductive due to the age of the pasture and the encroachment of weed species (tansy, thistle and blackberry). Therefore, increased weed control efforts and reseeding of pastures would enhance green forage areas and subsequently increase goose use.

Strategy: Initiate experimental fall fertilizing of green forage areas.

Rationale: Application of fertilizer to green forage areas in the fall has been shown to significantly increase goose use, versus areas that receive no fertilizer treatments (Percival 1993). It is believed that increased goose use is a result of increased biomass and protein content of fertilized green forage areas (Vickery et al. 1994).

Strategy: Implement habitat improvements projects funded as part of the Lower Columbia River - North American Wetlands Conservation Act (NAWCA) grant.

Rationale: Rehabilitation of water supply and distribution systems on the wildlife area will allow for improved farming, grazing, and wetland management capabilities, resulting in improved wintering Canada goose habitat and increased goose use of wildlife area lands.

Other Public Lands
Habitat Management

Strategy: USFWS, ODFW and WDFW should develop partnerships to provide goose foraging areas on non-wildlife management oriented public lands.

Rationale: Public lands in the form of state and federal prison facilities, state parks, U.S. Army Corps of Engineers and Bureau of Reclamation properties could be farmed to provide additional goose foraging areas that could reduce agricultural depredation of surrounding private lands. As an example, the Oregon State Parks Department in cooperation with area landowners, has implemented a farming program on the Mission Bottom State Park, north of Salem. Under this program, state park properties that were previously left fallow during the winter months are planted with an assortment of cover crops to reduce depredation problems on surrounding private lands. Planting of cover crops is conducted by local farmers.

Private Lands
Habitat Management

Geese have been among the greatest beneficiaries of modern agriculture throughout North America (Wendt and Boyd 1990). Large fields, heavy use of fertilizers, improved strains of grasses, cereals and corn has all helped to make life easier for them away from their breeding grounds. This means that, more than ever before, the future of geese is tied to the future of farming (Wendt and Boyd 1990). Since the vast majority of the farming land base in the WV-LCR is on private lands, development of agreements with private landowners to provide goose foraging areas remains a viable option to reduce agricultural depredations on private lands. Cooperative programs between landowners and wildlife management agencies, which call for providing waterfowl foraging areas on selected private lands, have proven to be

successful in reducing agricultural depredations caused by wintering waterfowl throughout North America.

Objective: Recognize and compensate private landowners for their role in providing Canada goose foraging areas on selected private lands by developing voluntary agreement, conservation easement or direct payment programs.

Strategy: Develop agricultural easement programs to provide goose foraging habitat on private lands.

Rationale: Additional goose foraging areas could be provided by private landowners who enroll lands in this program. Landowners would be financially compensated for planting goose forage on selected lands. Under this program, a landowner would receive a one-time payment in exchange for providing goose foraging areas. Hunting and hazing activities on these lands would be prohibited.

Strategy: Expand existing wetland easements and/or Wetland Reserve Program efforts in the WV-LCR.

Rationale: The Natural Resource Conservation Service, USFWS, ODFW, WDFW, and Ducks Unlimited could provide technical assistance to landowners who are enrolled in this program. Newly created or restored wetlands on these lands would benefit geese by providing additional food (moist soil vegetation) and roosting areas.

Strategy: Develop agreements with private landowners or corporations to provide goose feeding areas in fields that are left fallow.

Rationale: Under this program, private landowners would enroll fallow lands into this program on a short-term basis (1-5 years). These lands would be planted to annual grasses or legumes by the landowner with monetary and technical assistance provided by federal and state agencies. As an example, the Pacific Coast Joint Venture and the James River Corporation have developed an agreement that will result in the planting of annual grasses and legumes on 1,000 - 2,000 acres of fallow ground. James River and the USFWS are seeking funds to implement this program on a trial basis.

Primary Objective 4. LAND ACQUISITION AND MANAGEMENT

The acquisition and management of additional goose habitats in the WV-LCR is another option to help reduce agricultural depredation of private lands. By expanding the existing state/federal wildlife management land base for goose management purposes, hazing birds to these newly acquired areas will help to assist in reducing depredation problems. Geese will be afforded additional public lands to help sustain them.

However, the possibility of acquiring substantial tracts of wetlands and/or waterfowl foraging areas in the WV-LCR by state and federal agencies is decreasing. Rapid urbanization and industrialization of farmlands continues at a rapid pace, particularly in the Willamette Valley. In addition, wildlife management agencies face shrinking budgets, further reducing their habitat acquisition and management capabilities. Without increases in operating budgets, many agencies are unwilling to acquire new tracts of land due to their inability to effectively manage these lands on an annual basis. Therefore, wildlife agencies should work with local, regional and state planning and zoning groups and private organizations to develop programs for goose habitat conservation and development.

Goal: Decrease agricultural depredation of private lands by acquiring additional Canada goose habitats in the WV-LCR through fee title acquisition or donation.

Objective: Form a land acquisition working group consisting of personnel from the USFWS, ODFW, WDFW and private conservation organizations to develop and implement a Canada goose habitat acquisition program.

Strategy: Identify and prioritize potential tracts of land that could be acquired through fee title acquisition or donation from willing landowners.

Strategy: Obtain funding from targeted sources and implement goose habitat acquisition program.

Strategy: Develop an information and education program for landowners and state/federal politicians regarding the importance of acquisition of additional goose habitats in the WV-LCR .

Rationale: A viable option to reducing agricultural depredation of private lands would be to develop a Canada goose habitat acquisition program. Potential tracts of land would be identified and prioritized. Priority would be ranked according to present goose use of the area, the potential of the land to reduce agricultural depredation on surrounding private lands and the cost and size of the parcel. Emphasis would be placed on locating and acquiring tracts of land near existing wildlife areas and federal refuges. Acquisition can also protect many lands from growing urban sprawl especially in the Willamette Valley.

To implement the program, various public and private funding sources will be sought. In addition, an education program informing the public about the importance of acquiring additional goose habitat will be developed. Developing and implementing a Canada goose habitat acquisition program could assist in reducing agricultural depredation problems in the WV-LCR. Lands acquired through fee title acquisition or donation would be managed by state or federal agencies as wintering Canada goose foraging or sanctuary areas.

Primary Objective 5. DEPREDATION RESEARCH

Depredation of crops by waterfowl often causes serious economic damage and has been a recurrent management problem (Linduska 1976, Clark and Jarvis 1978). Research has shown that grazing by geese can be either beneficial or detrimental to crop yield and is influenced by many factors including: crop type, the stage of the growth of the crop at the time of grazing, the intensity of the grazing, the soil type and the weather (Wright and Isaacson 1978).

Several studies have shown that grazing by geese can reduce yields from agricultural grasslands (Patton and Frame 1981, Kahl and Samson 1984, Bedard et al. 1986, Conover 1988, Groot Bruinderink 1989, Percival and Houston 1992) though others have found no such effect (Kear 1965, Kuyken 1969). Kear (1970) and Taylor (1961) found that foraging by geese on winter crops may be beneficial to seed production except in abnormally wet seasons. Clark and Jarvis (1978) found that grazing of ryegrass by geese in the Willamette Valley resulted in slightly higher seed yields, when compared with ungrazed fields.

Crop depredations occur in several ways: (1) consumption of the harvestable portion of the crop, (2) consumption of the new shoots of a green crop, and (3) damage caused from the physical presence of the birds (Linduska 1976). In addition, introduction of weed species in agricultural fields has been documented (Patterson et al. 1989).

Goal: Increase the knowledge of the effects of winter goose grazing on private agricultural lands, including the geographic extent, amount, and economic value of goose damage.

Objective: Conduct damage assessment studies of goose grazing impacts on grass seed, grain, vegetable crop and pasture lands in the WV-LCR.

Strategy: Conduct damage assessment research on the major grass seed types found in the Willamette Valley. The three major grass seed types grown in the Willamette Valley include annual ryegrass, perennial ryegrass and fescue. Future research studies should be conducted by university personnel in cooperation with the farming communities and wildlife management agencies.

Rationale: Quantitative information on the effect of grazing by geese during winter on the seed yield of the subsequent grass crops is essential to the establishment and acceptance of realistic population goals that balance local damage concerns with the broader public

interest in geese and the acceptance of those goals by the public. Information on the effect of grazing by geese is also important to grass and legume farmers (ryegrass, fescue, clover, alfalfa, bentgrass, bluegrass) and the economy of Oregon. In 1996, in the WV-LCR, 423,790 acres of grass and legume seed acres were harvested worth an estimated $288,684,000 (OSU Extension Service 1997).

Strategy: Continuation of damage assessment study on Sauvie Island. In Fall 1996, Oregon State University, Department of Rangeland Resources began a two year study of the impact of goose use on winter wheat on Sauvie Island, near Portland.

Rationale: Findings from this study will be used to develop damage assessment techniques that farmers can use on wheat fields to determine the monetary loss of goose grazing. In 1996, grain farming in the Willamette Valley accounted for 104,550 acres worth an estimated $36,890,000 (OSU Extension Service 1997).

Strategy: Conduct damage assessment study of pasture lands along the lower Columbia River.

Rationale: A research study has been proposed by Columbia Region Staff (ODFW) to determine if there is a significant correlation between the decrease in livestock forage (pasture) production and utilization by geese after the hunting season and just before the traditional cattle grazing period along the lower Columbia River. Additional studies should be developed to assess damage to other crops in the area.

Strategy: Develop a statistically valid survey procedure to determine the number of private agricultural areas effected by Canada geese, in both time and space, and develop a subsampling methodology to determine the extent of these impacts on the region as a whole.

Rationale: Although there is little doubt that excessive numbers of Canada geese can adversely impact agricultural interests, there is little quantitative data available to place such impacts into a larger perspective. Statistically reliable knowledge of the extent and severity of such adverse impacts will allow managers to focus control efforts where they will be most effective. Additionally, such a program will, in the end, be the true test of the success or failure of this management plan. If the strategies in this plan work, the result should be that the number of areas with problems should decline and those areas with continuing problems should experience some reduction in effects.

Primary Objective 6. USDA-APHIS, WILDLIFE SERVICES (WS) ACTIVITIES

The responsibility for damage control involving migratory game birds is delegated to the U.S. Department of Agriculture through the Animal and Plant Health Inspection Service (APHIS) - Wildlife Services (WS) program (Appendix A).

In Oregon and Washington, WS is responsible for responding to complaints involving migratory game birds, by providing technical assistance and equipment to private landowners. In addition, WS agents are actively involved in hazing activities.

Various hazing techniques used singly or in a combination with one another can be effective in harassing geese from fields. Frightening devices such as scarecrows, which resemble humans, or a combination of flags, pie pans, or plastic bags cut into flags and attached to wooden stakes can be fairly effective. Reflective mylar flash tape or helium inflated balloons can be attached to stakes to move freely in the wind are examples of other types of frightening devices that may prevent geese from landing in the fields. Other techniques include the use of propane cannons, 12 gauge cracker shells and 15 mm pyrotechnic scare devices to haze geese from fields.

In addition to existing hazing techniques, research is currently being conducted into alternative methods. Repellents, such as Methyl Anthranilate, has been shown to be effective in limited applications (Avery et al. 1995). However, due to the need for multiple

applications, repellents can be cost prohibitive on large areas. Other repellents (Polycyclic Anthroponones) are currently being tested that may prove to be longer lasting and more cost effective; however, research results and acceptance may be several years away.

The use of livestock herding dogs, primarily border collies and Australian shepherds, to haze geese away has been gaining in popularity among golf course owners in the eastern United States. In Oregon, the manager of Black Butte Golf Course, located near Sisters, Oregon, has used a livestock dog to effectively haze 300-400 geese from the golf course. The use of chemical repellents and livestock herding dogs may not be initially accepted by many landowners; however, they do offer a new dimension to addressing goose depredations on private lands and should be further investigated as potential hazing tools.

Under this plan, to help with the hazing of Canada geese in the WV-LCR, WS agents would continue to provide landowners with technical assistance and equipment and would be actively taking part in hazing activities on a full-time basis during the fall, winter and early spring months (November - April).

Goal: Increase the capability of WS agents to assist private landowners in the WV-LCR to reduce agricultural depredations caused by Canada geese.

Objective: Develop an WS hazing program designed to effectively monitor and address agricultural depredation complaints throughout the WV-LCR.

Strategy: Increase the number of Washington and Oregon WS personnel and equipment to address agricultural depredations in the WV-LCR.

Rationale: As the wintering Canada goose population in the WV-LCR has increased, the scope and distribution of agricultural depredation complaints has increased. However, due to inadequate funding, Oregon and Washington WS programs have been limited in their ability to address the growing number of complaints. To properly address this issue, increased funding for Oregon and Washington WS programs is warranted.

Under WS proposals, in Washington, one WS biologist would coordinate planning and hazing/control activities from October 1998 - September 1999 for the lower Columbia River. A WS biologist will coordinate with Oregon WS, ODFW, WDFW, USFWS, and universities in the overall planning of hazing activities. They would also coordinate hazing activities, late season hunts, and any damage assessment data, with involved agencies. WS would also be responsible for report write-ups required for damage control activities. Three wildlife technicians would work from November-April for hazing, exclusion and coordination with affected landowners. One technician for Clark/Cowlitz Counties, one for Cowlitz County and one for Pacific/Wahkiakum Counties are proposed. Depending on depredations noted, field personnel can be relocated to concentrate efforts on areas of heaviest damage.

In Oregon, one full time WS wildlife biologist would be responsible for field supervision of the project. Duties would include developing damage assessment and reporting, evaluation of field techniques, public relations, etc. A total of five field technicians will conduct the hazing activities on private lands from November-April. Two technicians would work the lower Columbia River, two in the mid-Willamette Valley, and one in the southern Willamette Valley.

Strategy: WS will develop and implement alternative techniques to effectively haze or deter geese from private agricultural lands.

Rationale: Alternative control methods include the use of livestock dogs to haze geese from fields and the use of chemical repellents to deter geese from using selected areas. As an example, farmer D. Puckett of central Oregon has used border collies and Australian shepherds to protect his alfalfa fields from geese for the past 16 years. The approximate cost of a single, trained dog ranges from $1,000 to $3,000. In addition, research is being conducted on the use of chemical repellents such as Methyl Anthranilate and Polycyclic Anthroponones. Repellents have been used effectively in repelling geese when used in pools

of standing water and are currently registered for use on turf. WS should continue to search for effective chemical repellents for use on agricultural lands. Initial tests could be conducted on smaller locations in urban areas (i.e. golf courses, public parks, residences) until effective results can be achieved on large-scale applications.

Strategy: WS would collect information on the extent and nature of depredation problems.

Rationale: WS would collect information on the nature and extent of agricultural depredation complaints. WS would provide the USFWS, ODFW and WDFW with summaries of complaints, including specific locations, problem and crop description, number of birds involved, estimated economic impact, and management action recommended to be taken. WS would be responsible for developing a standard collection and reporting procedure for all depredation complaints handled. This information would be used to both assess the impact of the implemented strategies and to help focus control activities on specific problem areas throughout the WV-LCR region.

Depredation Permits And Orders

The Migratory Bird Treaty Act of 1918 established Federal authority to manage migratory birds and prohibit killing or take of specified birds (including eggs and nests) unless permitted by regulation. Prohibition of take included continual closed seasons on migratory nongame birds and insectivorous birds. The Act also established authority to promulgate take regulations for such activities as hunting seasons, capture and possession, scientific collection and depredation control. The determinations are based upon "due regard to the zones of temperature and to the distribution, abundance, economic value, breeding habits and times of migratory flight". Closed hunting seasons were mandated between March 10 and September 1; hunting seasons were restricted so not to exceed a period of 3.5 months in duration. Authority in the Migratory Bird Treaty Convention allows issuance of permits to kill the jurisdictional birds under extraordinary conditions when they become seriously injurious to agricultural or other interests.

Use of sport hunting to alleviate depredations is the preferred approach of the USFWS and the Pacific Flyway Council (Appendix E, Pacific Flyway Depredation Policy). Sometimes, due to the complexity of management, other approaches may be necessary. Lethal control or killing of birds is possible through migratory bird depredation permits and depredation orders. Killing of birds can be targeted at augmenting hazing and other depredation relief programs or to reduce populations. These options are covered in Title 50 Code of Federal Regulations (CFR) Part 20 Subpart K (hunting seasons) and Part 21 for migratory bird permits (Subpart D for depredation control).

50 CFR 21 Subpart D outlines the specific requirements for issuance of permits for control of depredating birds. Two regulatory options are available for control of depredating birds: permits or depredation orders.

Depredation permit requirements are outlined in subsection 21.41. These include application requirements and procedures and conditions of permits. In general, applications must contain information on the nature of the damaged crops, the extent of the injury and the species causing the injury. Applications are made to the Migratory Bird Management Office in each USFWS regional office. Permit conditions authorize the kill of a maximum number of the injurious birds by authorized individuals; birds may only be killed by shotgun (other methods must be specifically authorized) on or over the area described on the permit; blinds, calls, or other enticing devices may not be used; and all killed birds must be disposed by either donation to charitable institutions or to USFWS employees.

Depredation orders are authorized in subsection 21.42. A depredation order may be issued by the USFWS director upon the receipt of evidence that migratory game birds have accumulated in such numbers in a particular area as to cause serious agricultural damage. The order is subject to publication in the Federal Register and permits killing of birds under specified conditions. Birds may only be killed by shotgun; over or on the threatened areas; and birds may be used for food or must be disposed of by methods prescribed by the director. Any

order must be consistent with state laws and regulations and is specified to be an emergency measure only.

Goal: Investigate the possibility of using depredation permits and/or orders to reduce agricultural depredation by Canada geese in the WV-LCR.

Objective 1: Conduct a review of how effective lethal control is in certain situations and whether it could work in this situation.

Objective 2: Develop appropriate techniques for using lethal control to augment hazing and other damage control efforts for Canada geese in the WV-LCR.

Strategy: During Winter 1997-98, personnel from WS in cooperation from USFWS, ODFW, and WDFW should develop and experiment with lethal control of geese on designated areas in the WV-LCR.

Rationale: Development of methods to increase the effectiveness and efficiency of hazing and other damage control measures is essential to reduce agricultural depredations in the WV-LCR. These measures would only be used on an extremely limited, case by case basis.

Primary Objective 7. HARVEST MANAGEMENT

Regulation of the harvest is among the most visible and important aspects of waterfowl management. Generally, harvest management employs a variety of strategies, each seeking to control the size, distribution and composition of the harvest, but other objectives are also associated with harvest regulations (Baldassarre and Bolen 1994). These include, limit harvest of migratory game birds to levels compatible with their ability to maintain their populations, limit taking of other protected or sensitive species where there is reasonable possibility that hunting is likely to adversely affect their populations and prevent depredations on agricultural crops by migratory game birds (Blohm 1989).

Harvest regulations are a result of Federal rulemaking. These Federal frameworks are developed in consultation with the Pacific Flyway Council. The Council, in turn bases its recommendations on the goals and objectives established in the cooperatively developed Flyway population management plans. Nothing in this plan will alter this process or the administrative procedures and constraints currently applicable to the establishment of hunting seasons in the United States.

History

Before the implementation of goose harvest restrictions in 1984, the majority of the Canada geese harvested in the WV-LCR were dusky Canada geese (Chapman et al. 1969). In general, goose hunting seasons were long (approximately 93 days in length), with a daily bag limit ranging from 2 - 3 birds. The area open to hunting was unrestricted but was generally confined to federal refuges and surrounding private lands in the WV-LCR where geese were concentrated. Duskys are relatively less wary than other Canada goose subspecies and will readily use small fields, even fields ringed with brush. This vulnerability led to high harvest levels on the wintering grounds (Simpson and Jarvis 1979).

After the 1964 earthquake, the reproductive success of the dusky began to decline, resulting in lower recruitment into the population. The combination of high harvest on the wintering grounds and reduced reproductive success led to a decline in the dusky population.

Beginning in 1984, in an effort to protect the dusky Canada goose, while still providing harvest opportunities for other Canada goose subspecies, a series of restrictions were placed on fall Canada goose hunting in the WV-LCR. Designated open hunt areas were created around refuges and wildlife areas where geese continued to concentrate. The remaining portions of the WV-LCR were closed to goose hunting. Each hunt area was allocated a dusky "quota", which when reached, resulted in closure of that hunt area. Daily bag limits ranged from 2 - 3 birds, with a season dusky limit of one bird. To participate in this hunt, hunters were required to attend goose

identification courses offered by ODFW and WDFW. Hunters were asked to shift harvest efforts away from the dusky and concentrate harvest efforts on the rapidly expanding Taverner's Canada goose wintering population.

From 1984 to 1995, this season structure remained relatively stable and proved reasonably successful at protecting the dusky. During this time period, annual survival rates for the dusky ranged from 76% to 85% (Sheaffer 1993). However, the level of harvest of Lesser and Taverner's Canada geese was largely unaffected and the population continued to increase. Also during this time other Canada goose subspecies (western and cackling) began to winter in the region in increasing numbers. As a result of the increasing resident western Canada goose population, a September Canada goose season was initiated in 1990, in both Oregon and Washington.

Two estimates of the Canada goose harvest are available for the WV-LCR region. The first estimate is the total number of geese examined at the check stations in Washington and Oregon. Checking geese is a mandatory requirement within the WV-LCR region. Estimated harvest during the period 1984-96 ranged from less than 2,000 birds in 1984-85 to over 10,000 birds in 1996-97 (Fig. 6). A second estimate of the harvest is obtained from the annual waterfowl harvest survey and the associated parts collection survey conducted annually by the U.S. Fish and Wildlife Service (Trost and Carney 1989). This harvest estimate is, on the average, twice the estimated harvest from the check stations. This discrepancy is a matter of concern and will be investigated further. Regardless of the method used to measure the harvest, it is clear that the harvest of Canada geese is increasing as the total number of Canada geese increase in the area. Despite increases in the harvest, the wintering population continues to grow, with a subsequent increase in agricultural depredation complaints.

Beginning in 1996, WDFW offered operated an experimental late season in which hunters who had completed an advanced hunter education course were given the opportunity to participate in a special depredation hunt during the month

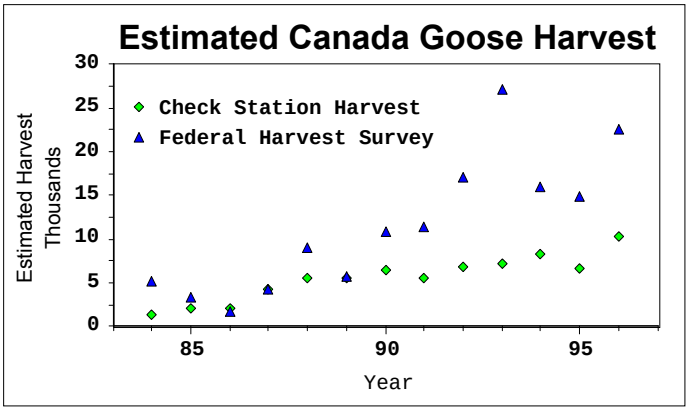

Figure 6. Willamette Valley - Lower Columbia River Canada goose harvest, 1984 - 1996.

of February and early March. Under this season, hunter efforts were focused on private lands where goose depredation problems were severe. In 1997, this season was continued in Washington. In addition, in 1997, ODFW extended their regular Canada goose season through February. Hunters who possessed a valid permit from the fall permit season were allowed to participate.

Harvest Management

Current Federal frameworks allow for three separate Canada goose season structures to be employed to harvest Canada geese. These seasons are governed by the annual regulations process and reviewed annually through the Flyway Council system. Seasons authorized can include a special early Canada goose season, a regular Canada goose season, and a special late Canada goose season. The total number of days in all three seasons cannot exceed 107 days and all seasons must occur between September 1 and March 10 as mandated in the Migratory Bird Treaty (1916) as implemented by the Migratory Bird Treaty Act (1918). All three season types are currently used in the WV-LCR region of Washington and Oregon.

Goal: To maximize harvest opportunity on abundant subspecies of Canada geese present in the WV-LCR region while limiting, to the established guidelines, the harvest of dusky and cackling Canada geese and preventing the take of any Aleutian Canada geese.

Special Early Seasons

Special early seasons are intended to direct harvest pressure at locally nesting goose populations before the arrival of migratory Canada geese from northern nesting areas. Therefore, the focus of these seasons is on locally nesting western Canada geese. Because special early seasons are timed to occur when Canada goose subspecies of concern are not present, hunter education directed at subspecies identification is not necessary, facilitating participation by more hunters.

Objective 1: To stabilize and reduce, where appropriate, the local breeding population of western Canada geese.

Strategy: Maintain and expand existing Special early Canada goose hunting seasons throughout the WV-LCR region.

Rationale: Locally breeding Canada geese continue to increase and contribute to the total number of Canada geese wintering in the WV-LCR region. Stabilization and reduction of this component of the wintering Canada goose population can help contribute to the overall wintering Canada goose population objective without appreciable risk to Canada goose subspecies of concern. Therefore, these seasons should be utilized to their full potential to maximize the harvest on this component of the wintering population.

Objective 2: Determine dates of first arrival of Canada goose subspecies of concern into the WV-LCR region.

Strategy: Conduct observations for neckbanded Canada geese throughout the period between September 15 and the opening date of the regular Canada goose hunting season in the region.

Rationale: Special early Canada goose seasons may be held between September 1 and before the opening of the regular Canada goose season. At present, such seasons may be held between September 1 and 15 without additional evaluation in the WV-LCR region. These dates are based on previous evaluations that indicted the absence of migrant Canada geese during this period. Further study through the observation of marked geese may enable further expansion of the early seasons affording additional harvest opportunity on Canada geese without threats to those Canada goose subspecies of concern.

Regular Seasons

A permit and harvest registration system has been used in the WV-LCR region since 1984 to manage the harvest of Canada geese. This system has proven effective in limiting the harvest of dusky Canada geese. The harvest quota for dusky Canada geese is established in the dusky Canada goose management plan (1997) and is currently set at 250 (165 in Oregon and 85 in Washington) (Appendix B). This total harvest quota applies to all special and regular Canada goose seasons within the WV-LCR region. Harvest of dusky Canada geese during the Special early seasons is assumed to be zero, based on previous evaluations. Cackling Canada goose harvest is presently managed under the harvest strategy for cackling Canada geese, an attachment to the Y-K Delta goose management plan. (See Appendix B for additional details regarding Pacific Flyway Management Plans). A season limit of one dusky is allowed in both Oregon and Washington before a hunter's permit is revoked. At present, permit revocation is State specific.

Objective 1: Maintain and enhance the permit Canada goose hunt within established quota allocations for dusky and cackling Canada geese.

Strategy: Continue to employ the permit hunting system currently in place and continue to require all harvested geese be examined at established check stations for monitoring the harvest of subspecies within established quotas.

Rationale: Continued harvest opportunities help to alleviate depredation problems during fall and winter while providing recreational opportunities and support for wildlife management programs.

Objective 2: Maintain or improve required goose hunter education courses.

Strategy: Develop a new education program to be administered in a consistent fashion in both states. Require hunters to pass a written test regarding subspecies identification

Rationale: Hunter education courses are designed to instruct goose hunters how to successfully identify the various subspecies of Canada geese while afield. In addition, this course stresses the importance of hunter ethics and how sport hunters are vital to addressing the agricultural depredation situation in the WV-LCR.

Strategy: Make the dusky harvest limit for permit holders 1 per season in either state.

Rationale: Currently, hunters can harvest 2 dusky Canada geese per season, if they hold permits in both Oregon and Washington. By implementing a consistent permit and testing procedure, permit hunters in both states should be equally informed and by making permit revocation reciprocal the harvest of dusky Canada geese could be further reduced.

Objective 3: Expand hunting opportunities within the permit Canada goose control zone while maintaining subspecific harvest management quotas.

Strategy: Open additional portions of WV-LCR counties to Canada goose hunting.

Rationale: Presently, in Oregon, most of the land within the WV-LCR region is closed to goose hunting by state regulation. Opening those areas with limited use by dusky Canada geese during the regular Canada goose season will provide additional harvest pressure to reduce Canada goose numbers and help to alleviate depredation problems. This strategy can only be employed if adequate harvest monitoring can be accomplished to ensure harvest quotas are maintained. Therefore, all areas that would have a reasonable probability of harvesting subspecies of concern would still be subject to mandatory harvest check stations and the permit requirement and provisions would still apply. Adding additional areas to the existing hunt areas will result in additional costs for check stations and law enforcement efforts. Without supplemental funds, ODFW and USFWS would have to redirect funds from other high priority work.

Strategy: Increase the number of hunt days within the existing regular season structure while maintaining subspecific harvest quotas.

Rationale: The current procedure is to limit hunting to selected days within the regular Canada goose season in both States. This approach is used to try and extend the hunting season across the longest time interval to help alleviate depredation complaints. Additional hunting days could increase the realized harvest of Canada geese and contribute to reducing agricultural depredation problems, provided they can be added without increases in the harvest of those subspecies whose harvest is controlled by quotas.

Special Late Season Permit Goose Hunt

Objective: Maintain (Washington) and evaluate the establishment (Oregon) of special late season agricultural depredation control hunts, specifically targeting private agricultural lands to help address depredation control programs.

Strategy: In Washington, continue the special season on agricultural damage areas only, January 24 - March 10.

Strategy: In Oregon, evaluate the establishment of a similar program and reduce the regular season ending date to accommodate the special season.

Rationale: Late season hunting (late January - early March) has recently been implemented in Oregon and Washington. The initial years have suggested that this approach can be effective in helping to alleviate depredation on specific farms by reenforcing nonlethal depredation control activities. The reason for considering the change in Oregon is to better address agricultural damage complaints and to focus the limited quota available for this hunt to specific problem areas. Bag limits for this hunt are identical to those enacted during the fall permit goose season. The total harvest quotas designed to protect the dusky and cackling Canada geese would be maintained.

Primary Objective 8. PUBLIC OUTREACH

Canada geese are a valuable public resource that annually provide thousands of residents of the Pacific Flyway with a multitude of recreational opportunities. However, outside most of the farming and scientific communities, the general public is unaware of the management complexity and the agricultural depredation problems associated with Canada geese in the WV-LCR. The public is also unaware of the diversity of stakeholders who have an interest in goose populations, and the necessary trade-offs in public values necessary to develop balanced management strategies. This plan proposes an organized effort to develop a public outreach plan to educate all interested parties and to assist in the achievement of the goals outlined in this plan.

Information and education efforts will focus on providing the public with information on the benefits and detriments that Canada geese provide. The effort should highlight the important contribution that private landowners make by providing Canada goose habitat in the WV-LCR and how landowners are affected by the increasing wintering goose population. It should also highlight the value of these geese to Native American and other resource users throughout the Pacific Flyway. In addition, the management history of Canada geese in the WV-LCR will be discussed and the proposed strategies to reduce agricultural depredation, while ensuring healthy Canada goose subspecies populations will be presented.

Goal: Increase public awareness of the benefits provided by Canada geese and the agricultural depredation problems in the WV-LCR.

Objective: The USFWS, in consultation with ODFW, WDFW, WS and Farm Bureaus will develop a public outreach program to increase the awareness of agricultural depredation problems associated with Canada geese in the WV-LCR and the benefits provided by these same geese throughout the Pacific Flyway. There is a need for outreach in Alaska, California, and Canada, with material that clearly shows how constituent interests may be affected, as well as the depredation dilemma.

Strategy: In winter 1997-98, USFWS, ODFW, WDFW, WS and Farm Bureau personnel would develop a public information and education program to increase the awareness of agricultural depredation problems associated with Canada geese and the complications of trade-offs in values across the flyway. Primary focus will be on developing information brochures, radio, television and newspaper articles detailing problems associated with Canada goose management in the WV-LCR and effects elsewhere in the Pacific Flyway.

Rationale: To successfully implement this plan, public support for proposed strategies is essential. Information and education efforts would inform the general public about the need to actively manage the wintering Canada goose population to reduce agricultural depredation in the WV-LCR, consistent with the needs and interests of other stakeholders in the Pacific Flyway. In some cases, existing management plans may need to be modified, which will require broad base public support.

Primary Objective 9. FUNDING AND IMPLEMENTATION

Many of the management strategies outlined in this plan will require additional funding for state and federal wildlife management agency activities to specifically address increasing depredation problems caused by Canada geese in the WV-LCR. Coordination of funding activities will be handled through the Pacific Flyway Council. Without proper funding of strategies outlined in this plan, efforts to reduce agricultural depredation in the WV-LCR will be difficult to achieve.

Goal: Reduce agricultural depredations in the WV-LCR by increasing funding for Canada goose management activities and implementing those strategies of this depredation plan identified as feasible and desirable approaches to address the problem.

Objective: Formation of a committee by the Pacific Flyway Council to seek funding sources and implement strategies for Canada goose management activities in the WV-LCR.

Strategy: During 1997-98, state/federal agency directors representing the Pacific Flyway Council will meet to prioritize management programs and develop a funding strategy to implement activities outlined in this plan.

Strategy: Land managers and population biologists should develop a cost and time implementation schedule for all strategies outlined in this plan.

Strategy: Conduct periodic meetings of the goose depredation working committee to review the progress of implementation of this plan.

Rationale: Strategies outlined in this plan will no doubt require increased funding for Canada goose management activities by state and federal agencies. Funding from state legislative and federal congressional levels needs to be sought to implement these activities, but these funds will likely be limited. In addition, funding programs within all management agencies must be investigated.

Representatives from the USFWS (MBMO, Regions 1 and 7), ODFW, WDFW, Alaska Department of Fish and Game, WS and the Oregon and Washington Farm Bureaus should annually meet to discuss the progress of the depredation plan and should develop a progress report to be reviewed by the Flyway Council at their annual March meeting.

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Appendix A

Management Agencies and Farm Bureaus

Migratory game birds are an international resource whose welfare and utilization are the vested interest of several countries. Many laws and statutes pertain to the legal authority for management of migratory game birds at national and state levels and help set a framework for cooperative management. This plan was developed to comply with mandates for management of migratory game birds by state and federal agencies in the Pacific Flyway.

U.S. Fish and Wildlife Service (USFWS): In the United States, preeminent authority and responsibility for migratory game birds lies with the Secretary of the Interior and is derived from international treaties to which the US Constitution specifies that only the Federal government can be signatory. Federal authority is legislated by the Migratory Bird Treaty Act of 1918 and its amendments (USDI, SEIS 1988). Countries involved in bilateral migratory bird treaties with the United States include Canada, Mexico, Japan and the Russian Commonwealth. The USFWS is the lead Federal agency for migratory game bird management. The mission of the USFWS is to conserve, protect, and enhance fish and wildlife, and their habitats for the continuing benefit of the American people. USFWS regulations concerning taking of migratory birds are contained in 50 Code of Federal Regulations (CFR) Part 20 Subpart K (hunting seasons) and 50 CFR Part 21 for migratory bird permits (Subpart D for depredation control).

Pacific Flyway Council (PFC): The Federal government, through the USFWS, actively cooperates with other countries, states and tribal organizations in the management of migratory game birds. Management in the United States and Canada is coordinated through a flyway concept. Flyways are administrative units that describe migration routes and distribution of migratory birds. These flyways have similar management problems and provide convenient mechanisms for management. Four flyways have been established for migratory game bird management in North America; the Atlantic, Mississippi, Central and the Pacific. Oregon and Washington are part of the Pacific Flyway.

Flyway Councils and Flyway Technical Committees exist and are comprised of administrative and technical representatives, respectively, from each state and most provincial wildlife agencies. In brief, states recognized the need for cooperative management of migratory game birds and for a forum that would promote their interest in game bird research, investigations, surveys and harvest management. The USFWS employs a flyway representative as a liaison to state and provincial agencies.

The Flyway Committees are composed of the principal waterfowl or migratory game bird biologist of the state or provincial conservation agencies. Associate members include persons working for private conservation agencies and organizations, university students and staff and other groups interested in migratory game bird research and management. These technical groups keep abreast of biological information about migratory game birds, trends in populations, demands for hunting, conflicting uses of habitats and related matters. They prepare recommendations for action by the Councils based on their technical knowledge and experience.

Flyway Councils are governed by by-laws and members are comprised mostly of state agency directors or their designated representative. Council recommendations are conveyed to the USFWS through the flyway representative and Council consultants. It is important to note that while there is USFWS participation in flyway meetings, final recommendations are formulated by the state personnel involved and are submitted to the Flyway Council for approval or further direction. Therefore, any subsequent revisions to this plan must be approved by the Pacific Flyway Council.

Oregon Department of Fish and Wildlife (ODFW): The mission of the Oregon Department of Fish and Wildlife is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations. ODFW is the principal state agency responsible for the conservation of fish and wildlife resources in Oregon, including migratory game birds. In Oregon, migratory game birds are defined as wildlife by ORS 496.004. Management policies and goals pertaining to migratory game birds are defined by ORS 496.012. On issues pertaining to migratory game birds, ODFW's primary representative is the Migratory Game Bird Coordinator. Policy and program direction dealing with migratory birds are outlined in a strategic management plan approved by the Fish and Wildlife Commission in 1993.

Washington Department of Fish and Wildlife (WDFW): The mission of the Washington Department of Fish and Wildlife is to preserve, protect, and perpetuate Washington's diverse wildlife and wildlife habitats, and to maximize the recreational and aesthetic benefits of wildlife for all citizens. Laws and regulations pertaining to goose depredation in Washington include: RCW 77.12.010, 77.12.040, 77.12.240, 77.12.260, 77.12.265, and WAC 232-12-086. On issues pertaining to migratory game birds, WDFW's primary representative is the Waterfowl Section Manager.

It is the policy of the Oregon and Washington Fish and Wildlife Commissions to share the management responsibilities for migratory game birds with the Federal government, primarily through the USFWS. These commissions recognize the importance of the Federal authority provided by the Migratory Bird Treaty Act of 1918 and its amendments but encourages cooperative flyway management programs including biological surveys, habitat development and acquisition, research, species planning, and the establishment of funding sources to maintain prescribed management programs.

U.S. Department of Agriculture - Animal Plant Health Inspection Service - Wildlife Services (WS): The mission of WS is to provide Federal leadership in managing problems caused by wildlife. The WS program carries out the Federal responsibility for helping to solve problems that occur when human activity and wildlife are in conflict with one another. The statutory authority for the WS program is the Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1468; 7 US.C 426-426b). Additionally, APHIS - WS field activities are conducted within authorizations received from cooperating Federal and State regulatory agencies.

WS activities involving federally protected wildlife species are coordinated with the USFWS. Activities involving resident wildlife (i.e., those protected by state laws) are

regulated by the respective state agencies and require appropriate authorizations. Additionally, other local laws and regulations often place further restrictions on WS activities.

WS and WDFW work under the protocol of the Problem Wildlife Response Guidelines. This agreement signed by both parties in November 1990, calls for WS to respond to all migratory bird problems primarily with extension type services. In cases where funds are available from other sources, operational work will be undertaken by WS.

WS and ODFW operate under a Memorandum of Understanding which provides the framework and authority for ODFW and WS to enter into cooperative agreements for the purpose of fulfilling ODFW wildlife management objectives. WS has agreed to assist ODFW in meeting their management objectives through these cooperative agreements. These agreements authorize WS to act as an official agent of ODFW, when requested, for the purpose of conducting wildlife damage management involving resident wildlife species.

In Oregon and Washington, WS can enter into agreements with private landowners to provide wildlife damage management for the protection of livestock, other agricultural crops, property and human safety. These agreements provide specific details, and identify the target species, methods to be used, and other stipulations requested by the landowner or manager and agreed to by the WS specialist. These agreements provide for WS to conduct operational wildlife damage management on a specific parcel of land. No agreements are necessary when WS provides technical assistance to private landowners.

Oregon And Washington Farm Bureaus: The Oregon and Washington Farm Bureaus are non-governmental, non-partisan and non-sectarian agricultural organizations dedicated to promoting agriculture on local, statewide, national and international levels. Comprised of volunteer farm and ranch families in Oregon and Washington, the Farm Bureaus analyze problems and act to achieve educational improvement, economic opportunity and social advancement on issues related to agriculture.

Appendix B

Existing Pacific Flyway Management Plans

The Northwest Oregon - Southwest Washington Canada goose agricultural depredation control plan is intended to complement the existing goals and objectives set forth in the following Pacific Flyway management plans. Objectives from these plans that are applicable to Canada goose management in WV-LCR are listed. Many of the Flyways management plans are currently being reviewed and updated.

Dusky Canada Goose Management Plan - 1997

Maintain and enhance the number of dusky Canada geese to preclude listing under the Endangered Species Act, at a level above the minimum viable population size.

To increase the number of dusky Canada geese to 20,000.

Maintain and enhance breeding ground habitat to maintain breeding populations and an annual production rate of at least 20 %.

Manage and enhance wintering and migration habitat to provide optimum food, water and sanctuary conditions for dusky Canada geese.

Minimize the incidental harvest of duskys, to be consistent with population maintenance and growth, while allowing management of abundant subspecies as necessary to assist in depredation control.

Continue efforts on Copper River Delta to increase dusky Canada goose production.

Cackling Canada Goose Management Plan - 1986

Achieve a minimum population of 80,000 geese and maintain effective hunting prohibitions until the population is at or above 110,000 as measured on a 3 year moving average obtained from a coordinated aerial fall inventory in central California, Oregon and Washington.

To restore and maintain a fall population of 250,000 geese as measured on a 3-year moving average obtained from a coordinated aerial fall inventory in central and northern California, Oregon and Washington.

Maintain nesting, migration and wintering habitats in sufficient quantity and quality to meet and maintain the population objectives.

Expand the geographical distribution of birds into historic and/or new habitat use areas, both breeding and wintering, to facilitate population and public use objectives.

Manage cackling Canada geese and other Canada goose populations with which they mix to provide for optimal aesthetic, educational, scientific and hunting uses, recognizing both subsistence and sport harvest needs.

Taverner's/Lesser Canada Goose Management Plan - Draft

Begin identifying and quantifying nesting/molting, staging/migration and wintering areas for Taverner's and lesser Canada geese in the Pacific Flyway.

Maintain adequate habitat to sustain current seasonal distribution of Taverner's and lesser Canada geese.

Begin population assessments of Taverner's and lesser Canada geese on nesting/molting, staging/migration and wintering areas.
Manage Taverner's and lesser Canada geese and other Canada goose subspecies where they mix, to provide for aesthetic, educational, scientific, and hunting uses, recognizing both subsistence and sport harvest needs.

Pacific Population - Western Canada Goose Management Plan - Draft

Monitor population trends so as to manage breeding levels as outlined in the management plan.

Maintain the currently known breeding and wintering distribution.

Maintain optimum sport harvest and provide for viewing, educational, scientific pursuits.

Yukon-Kuskokwim Delta Goose Management Plan - 1984

To restore population levels of cackling Canada geese, emperor geese, Pacific white-fronted geese and Pacific brant from the prime nesting areas on the Yukon - Kuskokwim Delta to Pacific Flyway wintering grounds.

	Cackling Canada Geese	White-fronted Geese	Pacific Brant	Emperor Geese
Population Objective	250,000	300,000	185,000	150,000
Minimum Population Levels	80,000	95,000	120,000	60,000

No hunting when populations fall below minimum levels. Hunting is possible again when populations rise above the following levels.

Cackling Canada Geese	White-fronted Geese	Pacific Brant	Emperor Geese
110,000	120,000	140,000	80,000

A harvest strategy has been included in this plan that establishes a wintering distribution goal to limit the number of cackling Canada geese to no more than 50,000 wintering in WV-LCR.

Aleutian Canada Goose Recovery Plan - 1991

The Aleutian Canada goose will be considered for delisting when the following criteria are met:

The overall population of Aleutian Canada geese includes at least 7,500 geese, and long-term trend appears upward.

At least 50 pairs of geese are nesting in each of the three geographic parts of the historic range: western Aleutians (other than Buldir), central Aleutians, and Semidi Islands, for three or more consecutive years.

A total of 25,000 - 35,000 acres of feeding and roosting habitat needed for migration and wintering have been secured and are being managed for Aleutian Canada geese.

Note: In 1996, a proposal to delist the Aleutian Canada goose was recommended by the Aleutian Canada Goose Recovery Team and the Pacific Flyway Council.

Appendix C

Summary of wintering and breeding ground surveys and banding and collar observation programs conducted in the WV-LCR.

Wintering Ground Surveys: Population information for most goose populations in North America is derived from the mid-winter survey (MWS) (Trost et al. 1990). The coordinated MWS, initiated in 1936, still provides the best basic information for managing goose populations in North America. Since there are only limited experimental surveys of the remote Arctic breeding grounds, estimates made of all major wintering concentrations of geese at a specified time provides indices to population trends. However, one major limitation of the MWS is that due to the lack of racial integrity in many groups of wintering Canada geese, including those found in the WV-LCR, subspecific distinctions can be very difficult. Therefore, the MWS provides an index of total wintering Canada goose numbers within a given area but does not reliably differentiate between subspecies. Since 1961, the MWS has been the primary survey that has provided the index of the total wintering Canada goose population in WV-LCR (Fig. 4).

Breeding Ground Surveys: Because mixing among wintering populations makes population specific estimates difficult, breeding population estimates are needed to assess environmental conditions and local management practices (Bromley et al. 1995). One drawback to breeding ground surveys for geese is that they are markedly more expensive than winter surveys, due primarily to the remoteness of areas that need to be inventoried or the areas are extremely large in size (i.e. breeding grounds of Taverner's and lesser Canada geese) and thus are not efficient to survey. Western Canada geese that nest throughout Oregon and Washington are surveyed annually along the lower Columbia River (active nest survey) by WDFW during April. In addition, westerns nesting in the Willamette Valley are surveyed as part of the annual Waterfowl Breeding Population Survey conducted by ODFW during late-April.

Banding and Collar Observation Programs: Aerial surveys can provide indices of population size, but to understand what causes population size to change, information is needed about changes in reproductive recruitment, survival, emigration and immigration rates (Hestbeck et al. 1990). Information on changes in these demographic parameters can be obtained through the analysis of band-recovery and mark-recapture (resight) data. These data can be collected for individual geese that are marked on breeding, molting, migration and wintering areas with either standard aluminum leg bands (USFWS and Canadian Wildlife Service 1984) or with leg bands and individual, observable tags, most notably neck collars (Helm 1955, Craighead and Stockstad 1956, Ballou and Martin 1964, Sherwood 1966, MacInnes et al. 1969, Hestbeck et al. 1990).

Banding and neck collaring programs of Canada geese have been used throughout the Pacific Flyway as early as the 1950s. From 1952 to 1965, approximately 5,692 duskys were banded on the Copper River Delta (Chapman et al. 1969). In recent years, banding and collaring programs have been undertaken on several subspecies of Canada geese that winter in the WV-LCR. Dusky and cackler banding and collaring programs have been sporadic since the mid-1980s, in an effort to determine wintering population size and survival. A neck collaring program was initiated in Oregon and Washington beginning in 1990 in an attempt to determine population size and distribution of resident western Canada geese. During the past several years lesser Canada geese have been banded near Anchorage in order to determine their winter distribution.

Appendix D

CANADA GOOSE FORAGE ACREAGE TOTALS FOR THE WILDLIFE AREAS AND REFUGES IN THE WV-LCR

Appendix D. Canada goose forage acreage for state wildlife areas and federal refuges in WV-LCR, 1996-97.

	Sauvie Island	Fern Ridge	E.E. Wilson	Shillapoo V. Lake	Ankeny	Baskett Slough	Finley	Ridgefield Complex	Lower Columbia	TOTAL
Annual Ryegrass	-	-	-	-	1,307	762	555	-	-	**2,624**
Perennial Ryegrass	-	-	-	-	690	30	478	90	-	**1,288**
Fescue	-	-	-	-	53	689	448	-	-	**1,190**
Clover	-	-	-	-	-	-	-	676	-	**676**
Pasture Grasses	3,000	-	30	640	-	-	-	1,845	1,600	**7,115**
Trefoil	-	-	-	-	-	-	21	-	-	**21**
Corn	275	40	-	120	75	-	-	110	-	**620**
Barley	-	-	-	120	-	-	-	-	-	**120**
Sudan Grass/Millet	500	110	-	-	50	20	40	-	-	**720**
Buckwheat	50	-	-	-	-	-	-	-	-	**50**
Moist Soil*	534	450	170	140	450	480	385	425	-	**3,034**
TOTAL	**4,359**	**600**	**200**	**1,020**	**2,625**	**1,981**	**1.927**	**3,146**	**1,600**	**17,458**

* Moist soil refers to natural vegetation that is produced on exposed mudflats after a controlled drawdown of water or when surface water disappears from a natural wetland in spring and summer (Fredrickson and Taylor 9182).

Appendix E

PACIFIC FLYWAY COUNCIL DEPREDATION POLICY

Policy: The Pacific Flyway Council (PFC) recognizes that the depredation of agricultural crops can become a serious economic problem in specific locations and that solutions often require complex biological, social, and political considerations. The challenge of managing damage by migratory game birds is striking the balance between maintaining game bird populations at levels that provide benefits to the majority of citizens while reducing the economic burden on the citizens who suffer losses.

Migratory birds are a shared international resource that provides significant benefits to the citizens of the United States and other countries. Federal authority to manage and protect migratory birds is derived from the Migratory Bird Treaty Act of 1918 [16 U.S.C. 503, as amended]. Through policy and practice the United States Fish and Wildlife Service (Service) shares the authority for the management of migratory gamebirds with the states through the Flyway Councils. The Fish and Wildlife Coordination Act (1956) authorizes the coordination between the states and Service for wildlife conservation purposes. Although the Service has been delegated the responsibility and authority for the management of migratory bird populations, the Animal Damage Control Act (1931, as amended in 1985 [P.L. 99-19]) delegates the federal responsibilities for conducting migratory bird damage control activities to the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Division (WS). Many states within the Flyway have developed Memoranda of Understanding with WS for implementation of damage control activities in the states. Some states have additional statutory responsibilities to private landowners for depredations by migratory birds. Therefore, management of migratory birds including damage control throughout the Flyway should be considered the joint responsibility of state and federal agencies.

This Policy Statement establishes a set of principles developed so the PFC may respond to depredations in a consistent and fair manner.

Depredation Principles:

1) Depredation control programs are subject to Flyway management plan objective levels and should include consultations with all affected agencies and stakeholders within the range of the subject populations.

2) Public hunting is the preferred method of population control for reducing agricultural depredations by migratory gamebirds.

3) When public hunting is not possible and non-lethal control options have been exhausted, other lethal control methods should be implemented. Other lethal population reduction methods should be determined on a case-by-case basis.

Therefore, it is the policy of the Pacific Flyway Council that depredation control programs be developed using the above principles and that management plans for control of regional migratory bird depredations be approved by the Pacific Flyway Council.