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## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
1011 E. TUDOR RD.  
ANCHORAGE, ALASKA 99503

FWLB  
1221

Office of Migratory Bird Management

### Memorandum

APR 1 1986

To: See Distribution List

From: Migratory Bird Specialist *Rich Pospisil*

Subject: Transmittal of Migratory Bird National Resource Plans (NRPs)

Enclosed are 24 NRPs for those migratory bird species pertinent to Region 7. These plans were prepared by the Office of Migratory Bird Management for national species of special emphasis. If you would like copies of plans for those species found outside Alaska, please contact me.

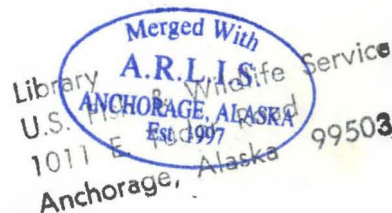
### Enclosures

### Distribution

Refuge Managers - Alaska  
Migratory Bird Management - North  
Migratory Bird Management - Anchorage  
Waterfowl Investigations  
Special Studies  
AOFWR  
Division of Ecological Services  
WAES  
NAES  
SEES  
Division of Realty  
Waterfowl Coordinator, ADF&G

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Anchorage Alaska



# MIGRATORY BIRD NATIONAL RESOURCE PLANS

July 1985



## Tundra Swan

- Eastern population
- Western population

## Trumpeter Swan

- Interior population
- Rocky Mountain population
- Pacific Coast population

## White-fronted Goose

- Eastern Mid-continent population
- Western Mid-continent population
- Tule population
- Pacific Flyway population

## Snow Goose

Greater

Lesser

- Mid-continent population
- Western Central Flyway Snow and Ross'
- Western Canadian Arctic population
- Wrangel Island population

## Brant

- Atlantic population
- Pacific population

## Canada Goose

- Atlantic Flyway population
- Tennessee Valley population
- Mississippi Valley population
- Eastern Prairie population
- Great Plains (Restoration) population
- Tall Grass Prairie population
- Hi-Line population
- Short Grass Prairie population
- Western Prairie population
- Rocky Mountain population
- Pacific population
- Pacific Flyway population
- Vancouver
- Dusky
- Cackling

## Wood Duck

MIGRATORY BIRD NATIONAL RESOURCE PLANS - Continued

Black Duck

Mallard

Northern Pintail

Canvasback

Eastern population

Western population

Redhead

Ring-necked Duck

Osprey

Sandhill Crane

Eastern population

Mid-continent population

Rocky Mountain population

Lower Colorado River Valley population

Central Valley population

Pacific Flyway population

Piping Plover

American Woodcock

Roseate Tern

White-winged Dove

Mourning Dove

Northern Spotted Owl

July 1985

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE WESTERN POPULATION OF CANVASBACK

### Purpose

This document communicates the objectives, strategies, and priorities for U.S. Fish and Wildlife Service activities for nationwide management of the Western Population of the Canvasback (*Aythya valisineria*) that were developed by the U.S. Fish and Wildlife Service. Lead Region for this plan is Region 1 with support from Regions 2, 6 and 7.

### Continental/National/Flyway/Regional Objectives

The Western Population of Canvasbacks is defined as those birds migrating and wintering within the Pacific Flyway. Therefore, the national objectives for these Canvasbacks are the same as those for the Pacific Flyway, and with only minor adjustment, those of Region 1 of the U.S. Fish and Wildlife Service. These objectives, as stepped down for the Western Population from the Waterfowl Habitat Strategy Team Report, are as follows:

- Maintain a breeding population of 175,000 birds of which 90,000 would be in the U.S. (Figure 1).
- Achieve an annual Western Canvasback Fall Flight of 300,000 birds.
- Provide for an annual harvest of 75,000 birds, of which 60,000 would be harvested in the U.S. (Figure 1).

### Population Distribution and Status

Distribution - Most of the Canvasbacks wintering in the Pacific Flyway breed in Alaska or Alberta (Figure 2). The Yukon Flats in Alaska and the Old Crow Flats in the Northwest Territories contribute an estimated 90% of the Western Population of Canvasbacks. Breeding populations during 1972-81 averaged 94,500 birds. Southern Alberta, that provides about one-third of the Canvasbacks recovered in the Pacific Flyway, had an average indicated breeding population of 86,700 birds during the same period. Montana and southwestern Saskatchewan also contribute to those birds wintering in the west. Bellrose describes the wintering population levels in the Intermountain area as less than 10,000 (British Columbia, 3,000; Oregon, 1,000; Nevada, 1,900; Idaho, 500; and Washington, 500). Surveys do not adequately include many regions providing canvasback to the Pacific Flyway.

Important migration stops for this population are the Great Salt Lake Marshes, Malheur NWR, Klamath Basin and the Humboldt/Carson Sink area. The major wintering area for this population is the San Francisco Bay. Smaller winter concentrations occur along the Pacific from British Columbia through Mexico.

Status - Canvasbacks are not very abundant and populations have declined since the arrival of the white man in the west. The western breeding population has fluctuated from 76,000 in 1961 to a high of 273,000 in 1977. Populations in the late 1970's and early 1980's are somewhat higher than those of the 1960's. Restrictive hunting regulations have been in effect since the late 1950's, limiting the Pacific Flyway to a 20-year average annual harvest of 27,500 birds (Table 1).

### Rationale for Objectives

The objective statements for the Western Population of the Canvasback presented in this plan are designed to maintain the stated breeding population, while increasing the fall flight. The objective fall flight will provide the opportunity to increase the harvest to historic levels.

### Problems

Threats to Habitat - Alaskan breeding habitat is being modified by oil and gas exploration and pipelines, transmission lines, mining, and agricultural and hydroelectric development. The breeding populations are also exposed to subsistence hunting. The major problem for breeding habitat in Canada is agricultural development. The breeding areas in the conterminous U.S. are being eliminated and modified by agricultural development and human disturbance. The wintering areas are affected by wetland filling, pollution and human disturbance.

Canvasbacks are difficult to census on the breeding grounds because they are present in low densities over large areas. Small survey biases often lead to wide fluctuations in annual breeding population estimates. This makes it difficult to accurately monitor short-term population changes.

Population Dynamics - Better management information on canvasback population dynamics should be gathered. With a 1971-80 average harvest rate of 33,000 the population is not expanding (Table 1). Should the harvest rate double, as called for in the objectives, the population may decline. Studies of survival rates and causes of mortality should be undertaken before increasing harvest rates. Small, local breeding populations in the continental U.S. may be eliminated at higher harvest rates.

### Strategies

The following list of Western Population Canvasback management strategies is indexed by priority for FWS regions. The priority scale of 1, 2 and 3 represents high, medium and low priorities, respectively.

	REGIONAL PRIORITIES					
	R1	R2	R6	R7	R8	R9
I. Maintain and Improve Breeding Habitat.						
A. Identify and minimize threats in						
Federal planning and permit processes.	1	-	1	1	-	1

July 1985

	R1	REGIONAL PRIORITIES				
		R2	R6	R7	R8	R9
B. Identify wetland complexes with potential for canvasback production and preserve by acquisition or easement.	1	-	1	1	-	1
C. Maintain high quality canvasback habitats on FWS lands.	1	-	1	1	-	1
D. Enhance production on private lands.	2	-	2	2	-	2
E. Acquire water rights.	2	-	2	2	-	2
F. Control predation and pest parasitism.	2	-	2	2	-	2
G. Test effectiveness of restocking captive reared canvasback in suitable production habitat.	-	-	-	-	3	3
II. Improve and maintain wintering and migration habitat.						
A. Acquire water rights.	-	1	1	-	-	1
B. Maintain high quality canvasback habitats on FWS lands.	-	1	1	-	-	1
C. Acquire or protect additional habitat.	-	2	2	2	-	2
D. Restore diked habitat on tidal marshes.	-	2	2	2	-	2
E. Participate in Federal planning and permit processes to enhance habitat or at least minimize habitat destruction.	-	2	2	2	-	2
F. Manage and maintain migratory habitat.	-	2	2	2	-	2
III. Conduct investigations to improve understanding of population dynamics.						
A. Conduct research on nest ecology.	1	-	1	1	1	1
B. Conduct research on mortality and recruitment.	1	-	1	1	1	1

July 1985

	R1	REGIONAL PRIORITIES				
		R2	R6	R7	R8	R9
C. Expand surveys for canvasbacks.	2	-	2	1	1	1
D. Continue population and harvest surveys.	2		2	2		1

### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP) developed by Regions covering portions of the Western Population Canvasback range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Services Regional Resource Plans for Region 1, 2, 6 and 7.

### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

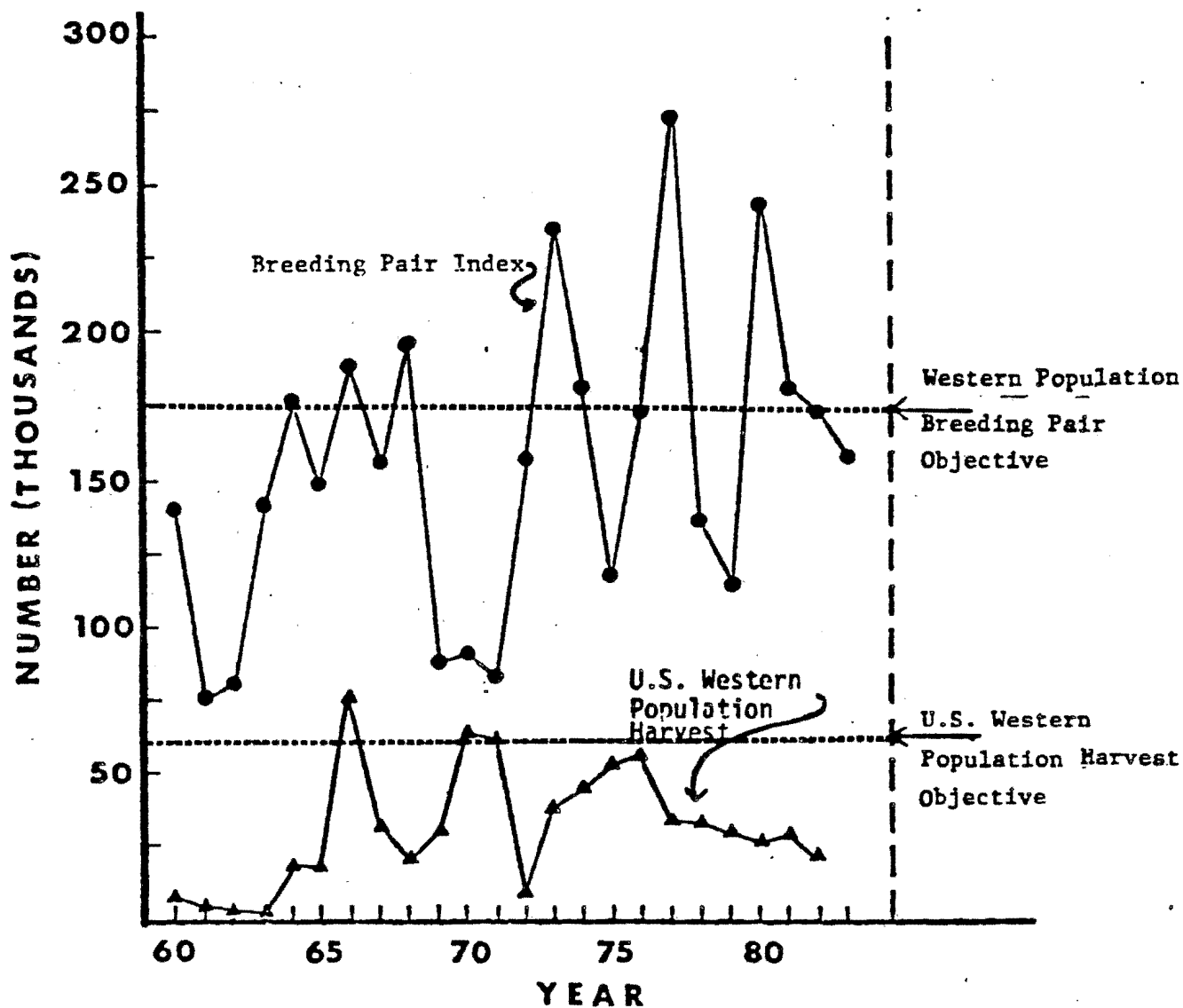


Figure 1. Historic and objective levels for breeding population index and historic levels for U.S. harvest for the western population of canvasbacks.

Table 1. Summary of canvasback harvest data for various states in the Pacific Flyway.

State	Average Annual Harvest	% of State Waterfowl Harvest	Rank in Bag
Alaska			
1961-70	230	0.4	16
1971-80	300	0.3	18
Arizona			
1961-70	750	1.6	13
1971-80	720	1.0	13
California			
1961-70	13,100	0.8	11
1971-80	19,550	1.1	9
Colorado (Western)			
1961-70	tr	tr	19
1971-80	tr	tr	18
Idaho			
1961-70	490	0.2	14
1971-80	580	0.2	13
Montana (Western)			
1961-70	200	0.2	16
1971-80	770	0.6	13
Nevada			
1961-70	1,670	2.1	9
1971-80	1,760	1.9	9
New Mexico (Western)			
1961-70	90	2.1	8
1971-80	40	0.6	15
Oregon			
1961-70	3,360	1.1	10
1971-80	3,950	1.0	9
Utah			
1961-70	2,140	0.9	10
1971-80	2,810	0.9	12
Washington			
1961-70	1,960	0.4	13
1971-80	2,120	0.4	13
Wyoming (Western)			
1961-70	10	0.1	16
1971-80	20	0.2	15
Pacific Flyway			
1961-70	22,190	0.7	13
1971-80	32,830	0.9	11

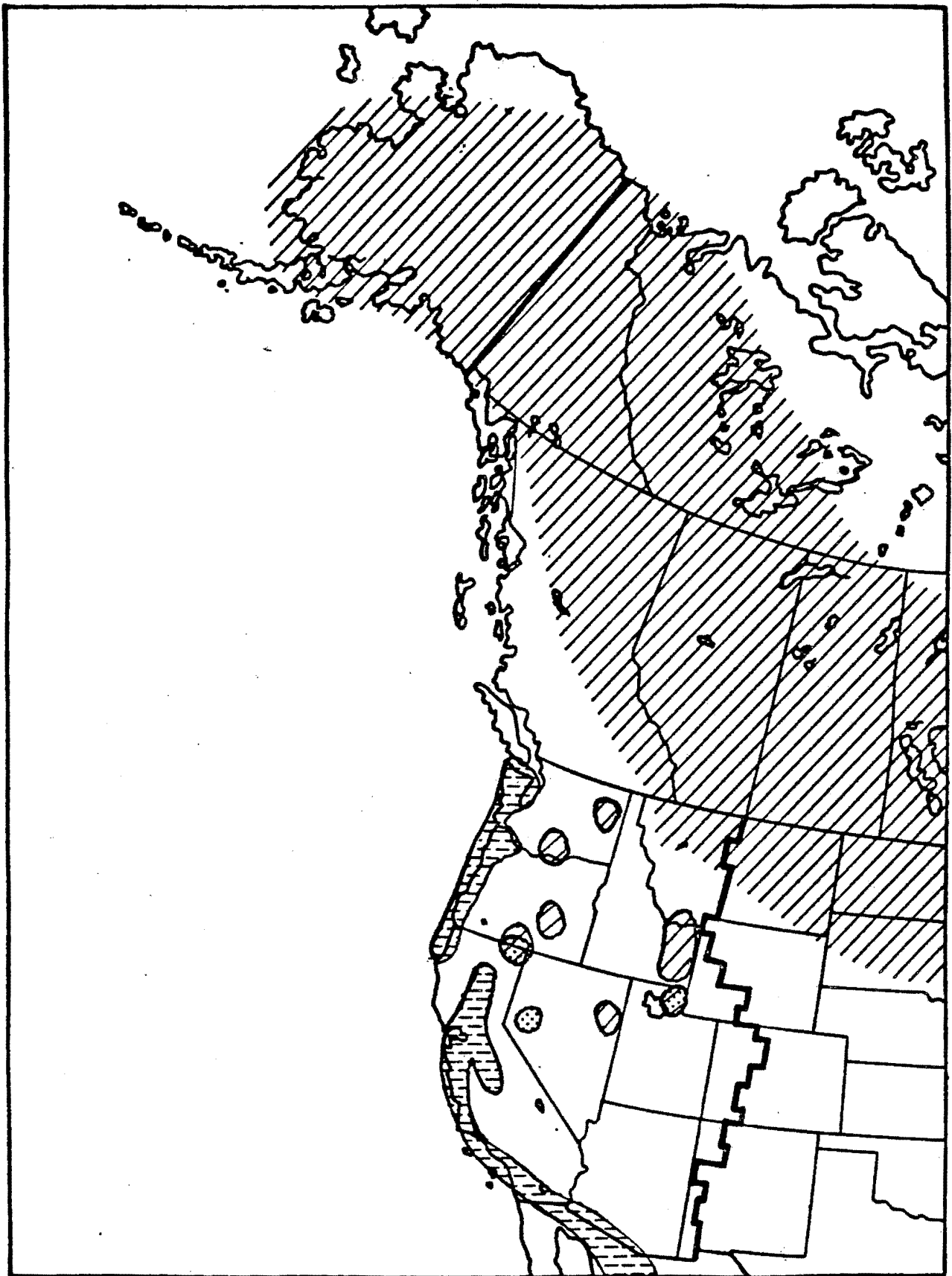


Figure 2: Breeding, Migration and Winter Distribution of Western Population Canvasback.

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE NORTH AMERICAN POPULATION OF REDHEAD DUCK

### Purpose

This document communicates the objectives, strategies, and priorities for U.S. Fish and Wildlife Service activities for nationwide management of the North American population of redhead ducks (*Aythya americana*) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead Region for this plan was Region 2 with support from Regions 1, 3, and 6.

### Continental/National Objectives

- . Maintain a minimum redhead duck breeding population of 875,000 birds, of which at least 180,000 would be within the United States.
- . Achieve an annual fall flight of 1,507,000 birds, of which at least 310,400 would be harvested in the United States.
- . Contingent upon attainment of breeding and fall flight objectives, provide for an annual harvest of 377,000 birds, of which 290,500 would be harvested in the United States.

### Flyway Population Objectives

No formal objectives are available at this time.

### FWS Regional Objectives

Objectives for individual FWS regions are to be developed in the future.

### Population Distribution and Status

Distribution - Redheads are a breeding bird of the northern prairies and associated parklands, and intermountain marshes of the West (Figure 1). Important breeding areas occur in the north central plains states of the United States and the Canadian Provinces immediately to the north. Other areas of importance include portions of California, Oregon, Washington, Nevada, and Minnesota. Only a few redheads nest east of Minnesota and only a few scattered nesting colonies are found in Alaska.

The bulk of the continent's redheads winter in coastal Texas and south along the Gulf Coast of Mexico. Pacific Flyway redheads winter chiefly along the west coast of Mexico (Figure 1).

Status - The redhead breeding population indices over the past 30 years (1955-1984) have ranged from a low of 396,000 birds in 1963, to a high of 974,000 birds in 1975 (a higher 1980 index has been disputed). Corresponding fall flight estimates for the past 15 years (1970-1984) ranged from 1,065,800 birds in 1974, to 1,580,600 birds in 1980. Fall flight estimates are derived by expanding breeding population indices. Trend lines for these data, plus harvest data, are shown in Figure 2.

The redhead breeding population comprises less than 2 percent of the total breeding population of the 10 important duck species annually surveyed on the breeding grounds. Harvest data, both for the period 1966-75, and the three most recent years of record (1981-83), show the redhead comprising approximately 1.2 percent of the total duck harvest in the United States. By Flyway, the redhead comprises the following percentage of the total duck harvest for the 1981-83 period: Pacific - 1.4 percent, Central - 2.2 percent, Mississippi - 0.9 percent, and Atlantic - 0.4 percent.

### Rationale for Objectives

**Breeding Population Objective** - The breeding population objective of 875,000 presented above has been achieved in three of the past 14 years and is thus well within the range of historical redhead estimates. It is 1 percent higher than the 1983 estimate, 16 percent above the 20-year average, and four percent above the 1974-83 average. It is six percent higher than a short-term objective of 825,000 listed in a 1976 Service environmental assessment.

**Fall Flight Objective** - The fall flight objective of 1,507,000 birds is based on a summer survival rate of 90 percent for adult females, 95 percent for adult males, and a recruitment rate of 1.1 IF:AF. It is recognized that these estimates are based on relatively small sample sizes. Nonetheless, the recruitment rate is thought to be minimal and could likely be increased considerably through management efforts.

**Harvest Objective** - The harvest objective of 377,000 has not been attained for redheads in the past 14 years. The closest attainment of the objective level were 281,800 in 1969, and 285,800 in 1971. However, to harvest 25 percent of a fall flight is not an unrealistic expectation; such harvests are presently being sustained by other species. Furthermore, redheads are presently sustaining such total mortality, but not by legal hunter harvest. As with canvasbacks, a large and unexplained mortality is occurring in redheads. The 80 percent mortality of juveniles is especially troublesome and may be the key to increasing hunter harvest.

### Problems

Although the recent redhead population has exceeded the average of the past 29 years, habitat loss and degradation of habitat quality on both the breeding and wintering areas works against meeting the population and harvest objectives set for the redhead. As an over-water nester, the redhead's nesting success is more greatly curtailed by poor water conditions than most other species of ducks. There is evidence of low recruitment in the prairie pothole breeding area, in part due to predation which is greatest during poor habitat (low water) conditions. Loss and degradation of habitat in the inter-mountain breeding area of the Great Basin occurs where 226,000 acres of redhead production habitat is not protected.

Redhead duck welfare is threatened on the major wintering areas along the Texas coast by disturbance and loss of seagrasses within the Laguna Madre. Turbidity from dredge and fill activities and herbicidal inflow into the Laguna are believed to impact seagrasses used as food by redheads.

Waterfowl use of Cayo Atascosa, Laguna Atascosa, and Laguna del Cayo on Laguna Atascosa National Wildlife Refuge has declined dramatically (during the 1950's, approximately one million waterfowl, particularly redheads, and geese, utilized these

waters for feeding and resting). Redhead wintering habitat in the Texas bays and the Gulf of Mexico is also increasingly threatened from oil spills. A recent examination of winter population data for the redhead, conducted by Region 2, indicates that the Gulf of Mexico wintering population may be shifting its distribution southwesterly down the Gulf Coast. While there may be several reasons for the declines, habitat degradation is the prime suspect.

### Strategies

The following list of redhead duck management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium, and low levels.

#### REGIONAL PRIORITIES

	R1	R2	R3	R6	R8	R9
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- I. Protect breeding, migration, and wintering habitats used by redheads.
  - A. Reduce loss of productive wetlands for nesting by acquiring quality nesting and brood rearing habitat, either by easement or purchase. Use goal in Region 1's 1975 redhead breeding habitat concept plan to preserve 75% of the unprotected habitat (169,500 acres) in Region 1, primarily in the Inter-mountain Area.
  - B. Enforce wetlands protection laws and the permit process for wetlands conversion.
  - C. Increase operation and maintenance funding on selected Refuges and Waterfowl Production Areas to improve redhead recruitment. Intensify seasonal predator management techniques in prime redhead nesting areas.
  - D. Coordinate with Department of Agriculture to include actions to improve nesting conditions in long-term set-aside and other wetland protection programs.
  - E. Work with private agricultural interests to minimize loss of water in important breeding areas and destruction of emergent vegetation around marsh edges.
  - F. Fish and Wildlife Service Ecological Services field offices should work closely with U.S. Army Corps of Engineers, and other Federal, State, and local agencies, as well as private entities to ensure that seagrass

1	-	1	1	-	-
2	2	2	2	-	-
2	-	2	2	-	-
2	-	2	1	-	2
1	-	1	1	-	-

REGIONAL PRIORITIES  
R1 R2 R3 R6 R8 R9

beds are not detrimentally affected by dredge and fill activities and contaminant inflows.	-	1	-	-	-	-
G. Determine if there are areas of high redhead use along the Texas Coast in private ownership which are naturally protected from catastrophic oil spills (such as the 1979 blowout of the off-shore well Ixtoc I). Attempt to protect these areas through acquisition or other means.	-	1	-	-	-	-
II. Intensify efforts to gather and analyze population dynamics data for the North American Redhead population.						
A. Continue existing population surveys, including Mexican winter inventories, on a regular basis in cooperation with Mexico's Fauna Silvestre.	-	-	-	-	-	1
B. Initiate research to determine causes for the high rate of juvenile mortality within the redhead population.	-	-	-	-	1	-
C. Conduct ground counts on Laguna Atascosa NWR, Aransas NWR, and other refuges which winter redheads at the same time that special surveys are flown to allow simultaneous comparison of zonal and refuge population trends.	-	2	-	-	-	-
D. Initiate research to determine reasons for the dramatic decline in the redhead population on the upper Texas Coast (Galveston to Corpus Christi).	-	2	-	-	1	-
E. Pull together existing research results on aquatic plants in the Laguna Madre and develop a plan to prevent or minimize losses to seagrass habitat.	-	2	-	-	1	-
F. Determine the factors limiting aquatic vegetation and redhead use on Laguna Atascosa Refuge impoundments.	-	2	-	-	1	-

July 1985

Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRPs) developed by regions covering portions of the North American Redhead Duck range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Services Regional Resource Plans for Regions 1, 2, 3, and 6 and the draft Habitat Strategy Plan produced by a special U.S. Fish and Wildlife Service task force. Population and other data was obtained from U.S. Fish and Wildlife Service files.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240 (202/265-3207).

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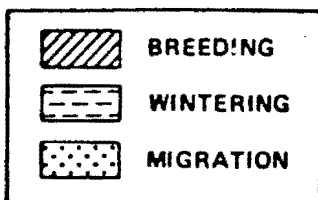
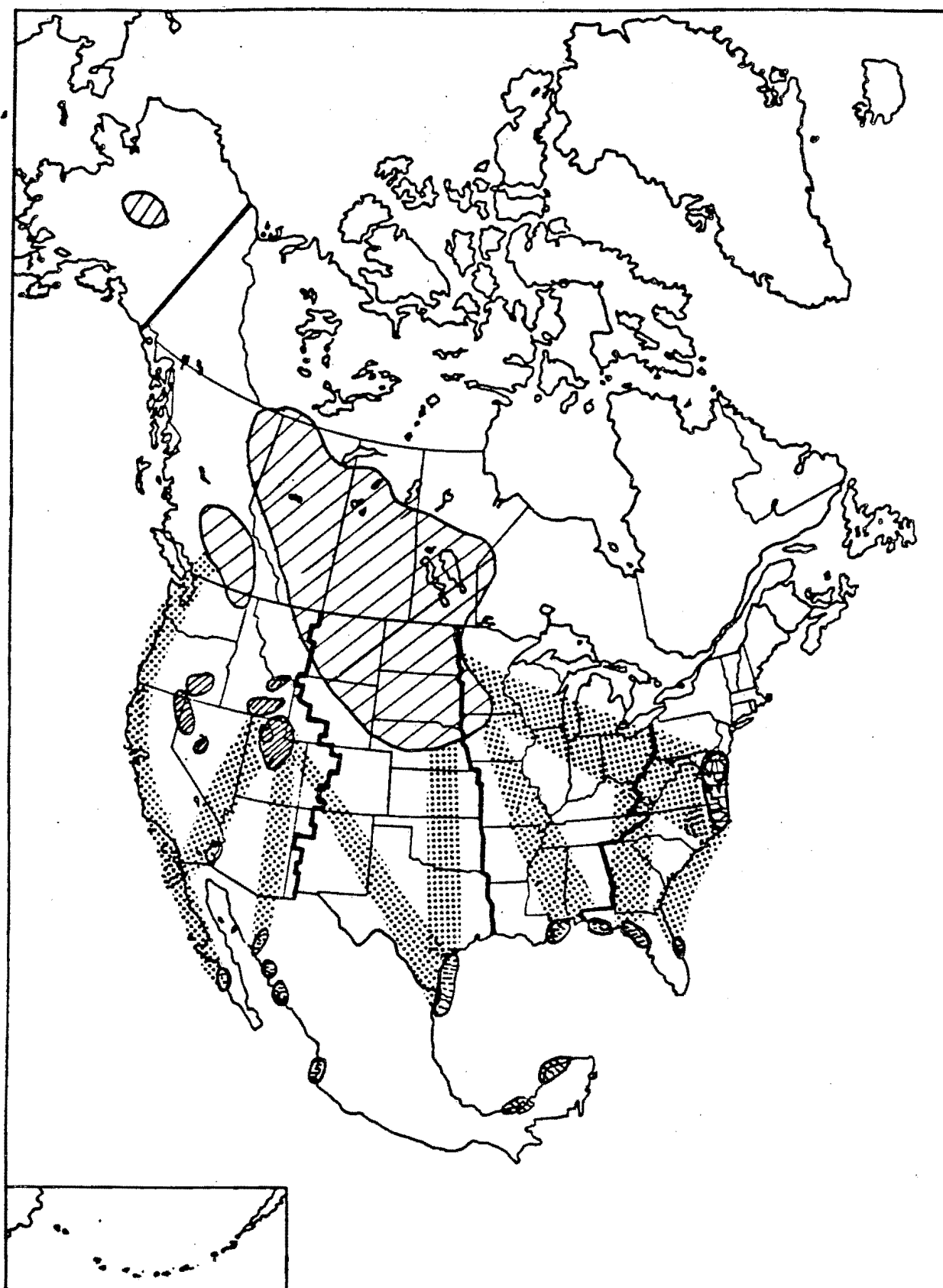


Figure 1. Primary Breeding, Migration, and Wintering Distribution of North American Redhead Duck. After Bellrose 1976.

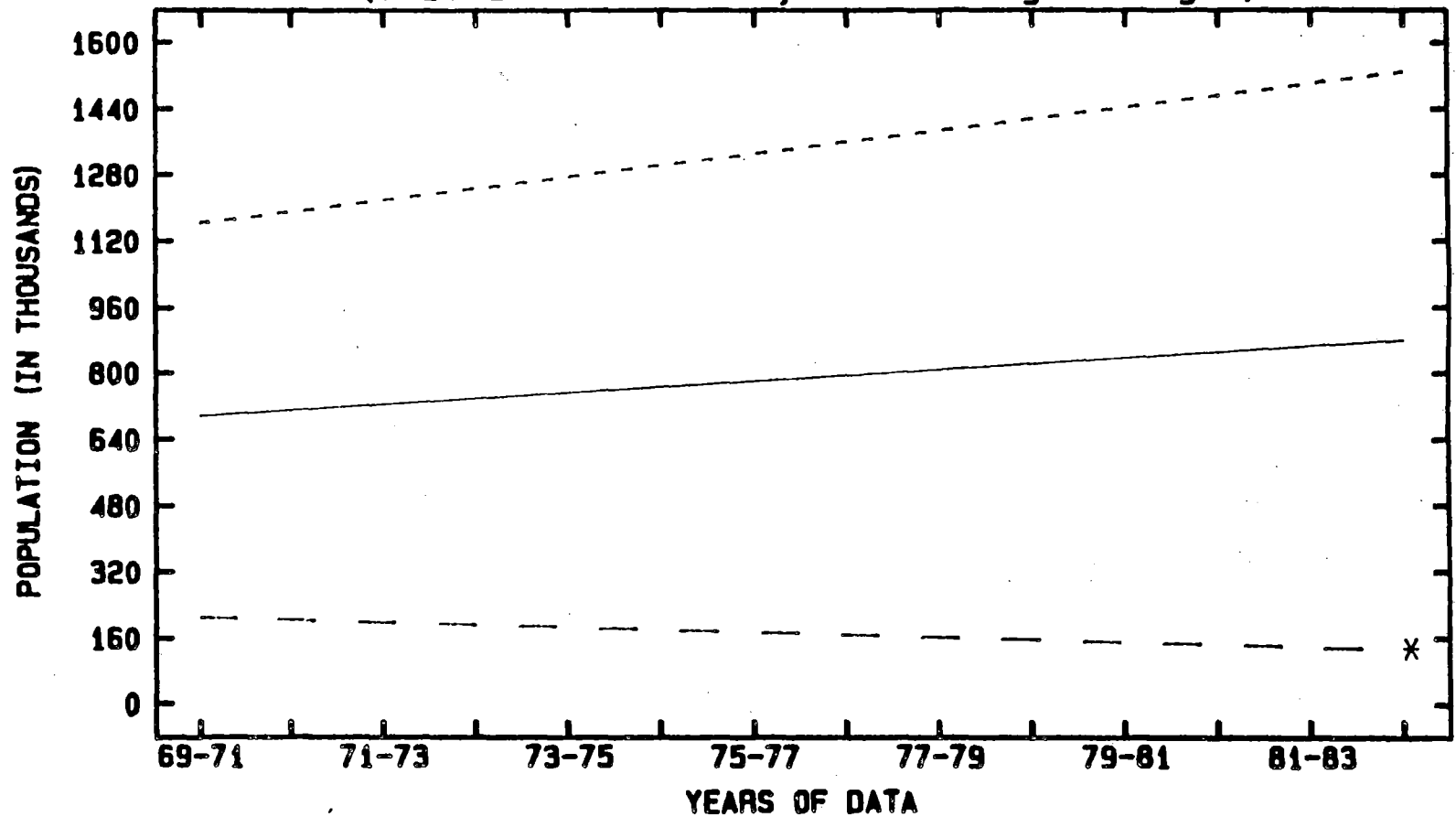
Figure 2

# NORTH AMERICAN REDHEAD POPULATION TRENDS (calculated from 3-year running averages)

FALL FLIGHT  
(derived estimate)  
cc = .838  
se = 80

BREEDING  
(3-year avg.)  
cc = .615  
se = 78

HARVEST  
cc = .398  
se = 62



1/ Estimate derived from breeding population

\*Harvest data for 1984 is not available

2/ North American harvest extrapolated for U.S. Survey  
(77% U.S.; 23% Canadian)

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE MID-CONTINENT POPULATION OF SANDHILL CRANES

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Mid-continent Population (MCP) of Sandhill Cranes that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. The Mid-continent Population is a mixture of three subspecies of sandhill cranes: the lesser sandhill crane (Grus canadensis canadensis), which constitutes about 70 percent of the population; the Canadian sandhill crane (Grus canadensis rowani) which constitutes about 20 percent of the population; and the greater sandhill crane (Grus canadensis tabida) which constitutes about 10 percent of the population. Lead region for this plan was Region 2 with support from Regions 6 and 7.

### National Objectives

While some MCP cranes nest in Alaska and a few winter in Southeast Arizona, this population is essentially a Central Flyway population. Therefore, the national objectives are the same as those for the Central Flyway.

### Central Flyway Objectives

- . Maintain MCP of sandhill cranes at stable level of at least 90 percent and not more than 110 percent of the 1980 population. The 1980 population was 540,000 birds. Therefore, the objective range is from 486,000 to 594,000 MCP sandhill cranes as counted in the spring sandhill crane count.
- . Maintain the 1980 geographic and temporal distribution of MCP sandhill cranes.
- . Maximize high-quality recreational use of MCP sandhill cranes consistent with population and distribution objectives.

### Regional Objectives

Alaska is the only state to host nesting sandhill cranes of the Mid-continent Population (MCP). The 1957-80 average breeding population for Alaska was 121,700. Because large areas of habitat are not surveyed and existing estimates are subject to gross error, it is possible that the total Alaska population exceeds 200,000 cranes. It is estimated that 91 percent of the breeding cranes in Alaska belong to the MCP and the other 9 percent belong to the Pacific Flyway Population of lesser sandhill cranes. The FWS Region 7 (Alaska) objective is to maintain production and migration habitat to contribute to the North American objective of 540,000 cranes.

Region 6 has responsibility in the spring and in the fall for the total population of MCP cranes as they migrate through Region 6 states. In fact, approximately 94 percent of the MCP sandhills are located in the central Platte River Valley in mid-March. Thus, Region 6 shares substantially in maintaining the North American objective of 540,000 cranes.

A large percentage of the total MCP crane population migrates through Region 2 and into Mexico to winter. Winter population information is inadequate, but possibly less than half of the population is accommodated within Region 2, including Arizona (in the Pacific Flyway), during the average winter season. Therefore, Region 2 shares in maintaining the North American objective of 540,000 MCP cranes by wintering a significant portion of the MCP in Texas, New Mexico, Oklahoma, and Arizona, as well as hosting the total population during migration.

#### Population Distribution and Status

**Distribution** - The range of MCP sandhill cranes is extensive (Figure 1). During the breeding season these cranes are widely scattered throughout central and northern Canada, Alaska, and into northeastern Siberia. The autumn migration routes of MCP cranes include important staging areas in Alberta, Saskatchewan, Manitoba, and North Dakota. During autumn and winter, MCP cranes are in Oklahoma, Texas, New Mexico, Arizona, and northern Mexico. During March of each year, nearly all MCP cranes are in the central Platte River Valley of Nebraska.

**Status** - Available information indicates that the MCP crane population has increased in recent years which suggests that ongoing management programs have not been limiting. March survey information indicates an increasing population; however, this may be partially due to refinements in the survey. Figure 2 presents a population graph and plotted trend lines. The short-term (1975-1984) trend illustrates the dramatic increase in MCP sandhills over the past 10 years. See Table 1 for population data and distribution of MCP cranes during the March survey from 1974-1984.

A general closed season was established for all cranes in the United States May 20, 1916, and remained in effect until January 1, 1961, when a 30-day season was authorized on lesser sandhill cranes in eastern New Mexico and western Texas. MCP cranes are not legally hunted in nine states, Mexico, and two Canadian provinces. Estimated harvests of MCP cranes in the Central Flyway states are shown in Table 2. Hunting seasons have been established in response to a healthy population and increased depredation.

#### Rationale for Objectives

Objectives were established to stabilize the rapidly expanding MCP sandhill crane population. The dramatic increase in the population over the past 10 years has resulted in increases in crop depredation by this species. Although data indicate that hunter demand for MCP cranes may have stabilized, increased harvest would help to alleviate depredation problems and stabilize the population.

#### Problems

More problems concerning the MCP sandhill cranes center on lack of information or precision in the data used to manage the population. Remoteness of the breeding grounds presents both technical and logistical problems in estimating the breeding population and production. The extent of subsistence harvest by native people is difficult to estimate.

In Alaska, the alteration or loss of habitat on breeding and staging areas is caused by oil and gas, hydropower, and mineral developments, as well as reindeer husbandry. Loss and degradation of habitat along the Platte River impacts traditional migration habitat in Nebraska. Existing wintering habitat in Texas is decreasing in both quality and quantity.

July 1985

Present population levels frequently create local depredation problems—notably in Central North Dakota and Texas. Control of an increasing population may be difficult due to lack of hunter interest.

### Strategies

The following list of strategies for management of the MCP sandhill cranes is in priority for FWS regions. The scale of 1, 2, and 3 represents high, medium, and low levels, respectively.

		REGIONAL PRIORITIES				
		R2	R6	R7	R8	R9
I.	Protect essential breeding habitat for MCP sandhill cranes					
	A. Participate in planning, permitting, and operational monitoring phases of economic development activities potentially affecting essential habitats of sandhill cranes.	-	-	1	-	-
	B. Protect habitats of sandhill cranes on National Wildlife Refuges in Alaska.	-	-	1	-	-
	C. Regulate reindeer husbandry on the NWR System and encourage grazing on non-essential habitats of other lands.	-	-	1	-	-
II.	Improve breeding population data base and management.					
	A. Expand and improve surveys, research, and banding programs for lesser sandhill cranes in Alaska.	-	-	2	2	2
	B. Determine the size and characteristics of the subsistence harvest of sandhill cranes in Alaska and provide for regulated spring and summer subsistence harvests of sandhill cranes in Alaska.	-	-	2	2	2
III.	Protect essential wintering and staging habitat for MCP sandhill cranes.					
	A. Identify and delineate areas used by wintering cranes.	2	-	-	-	-
	B. Encourage preservation of key habitats on private lands. Seek funds to assure the preservation of threatened key migration habitats by lease, easement, fee title purchase, or cooperative agreements with emphasis on wet meadows adjacent to the Platte River in Nebraska, and major roosting sites in wintering areas; e.g., the Wilcox Playa in Arizona and major roosting lakes in West Texas.	1	1	-	-	-

July 1985

REGIONAL PRIORITIES					
	R2	R6	R7	R8	R9
C. Seek minimum flows in the Platte River from regulatory agencies and developers.	-	2	-	-	-
D. Encourage preservation and improvement of habitats controlled by government agencies.	2	2	-	-	2
IV. Alleviate crop depredation problems caused by MCP sandhill cranes.					
A. Direct recreational hunter harvest to areas where losses of agricultural crops have been verified during the periods when depredations are likely to occur.	2	2	-	-	-
B. Maintain ability to respond promptly to requests for animal damage control assistance with crane depredations.	2	2	-	-	-

#### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRPs) developed by regions covering portions of the MCP sandhill crane range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

#### Sources

This plan was derived from the U.S. Fish and Wildlife Service's Region 2, 6, and 7 Regional Resource Plans and from the Management Plan for Mid-continent Sandhill Cranes written by the Technical Committee of the Central Flyway Council.

#### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240 (202) 254-3207.

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Distribution of Sandhill Cranes Within the Mid-continent Region During the Coordinated Spring Survey, 1974

Date	ND	SD	CPRV (1)	NE Other	KS	CO	OK	NM	TX
3/24-31/74	0	0	162,000 (91%)	9,000	1,900	—	400	—	3,200
3/25-30-75	0	0	223,500 (98%)	2,400	900	500	100	100	Tr
3/22-26/76	- (2)	0	147,500 (97%)	2,800	300	—	100	1,000	800
3/13-23/77	0	300	173,400 (79%)	1,200	1,600	—	400	12,500	30,700
3/20-24/78	-	0	190,800 (95%) (4)	2,200	700	—	—	2,300	4,900
3/20-29-79	0	0	205,300 (97%)	2,600	1,100	500	1,500	0	0
3/24-4/15/80	Tr (3)	-	257,900 (96%)	4,200	4,100	0	100	500	1,400
(3/26-4/4/80)			541,300 (98%) (5)						
3/22-28/81	0	0	251,700 (86%)	8,300	11,200	200	0	0	21,800
3/22-27/82	0	Tr	414,200 (95%) (6)	7,100	2,000	2,800	0	100	7,800
(3/25-26/82)			490,100 (96%) (5)						
3/21-25/83	0	0	343,100 (97%) (6)	4,100	200	0	200	Tr	7,000
3/25-30/84	0	Tr	261,800 (93%) (6)	18,100	900	—	1,100	Tr	800

(1) Central Platte River Valley.

(2) No survey

(3) Less than 50

(4) Survey techniques changed from ocular cruise type to ocular line-transect sampling.

(5) Vertical photo line-transect sampling (experimental).

(6) Survey technique changed from ocular line-transect sampling to ocular line-transect sampling with oblique photo/o adjustment.

Table 2. Estimated Harvests of Sandhill Cranes in the Central Flyway.

State	1975	1976	1977	1978	1979	1780	1981	1982	1983
Colorado	91	106	39	106	129	68	92	49	69
Montana	16	29	18	36	14	16	11	21	27
New Mexico	911	858	1,456	1,089	1,170	1,019	907	335	343
North Dakota	2,122	52	4,078	2,777	2,733	2,245	2,395	2,469	6,549
Oklahoma	142	200	410	389	397	363	397	535	399
South Dakota	86	12	47	19	19	130	78	212	178
Texas	6,123	6,122	6,094	5,720	5,917	6,305	6,245	4,295	5,522
Wyoming	<u>6</u>	<u>14</u>	<u>9</u>	<u>10</u>	<u>—</u>	<u>6</u>	<u>9</u>	<u>—</u>	<u>13</u>
Total	9,497	7,393	12,151	10,146	10,379	10,152	10,134	7,916	13,100

1975-1983 Average Central Flyway Harvest = 10,096

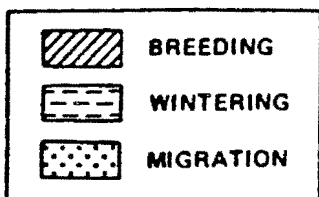
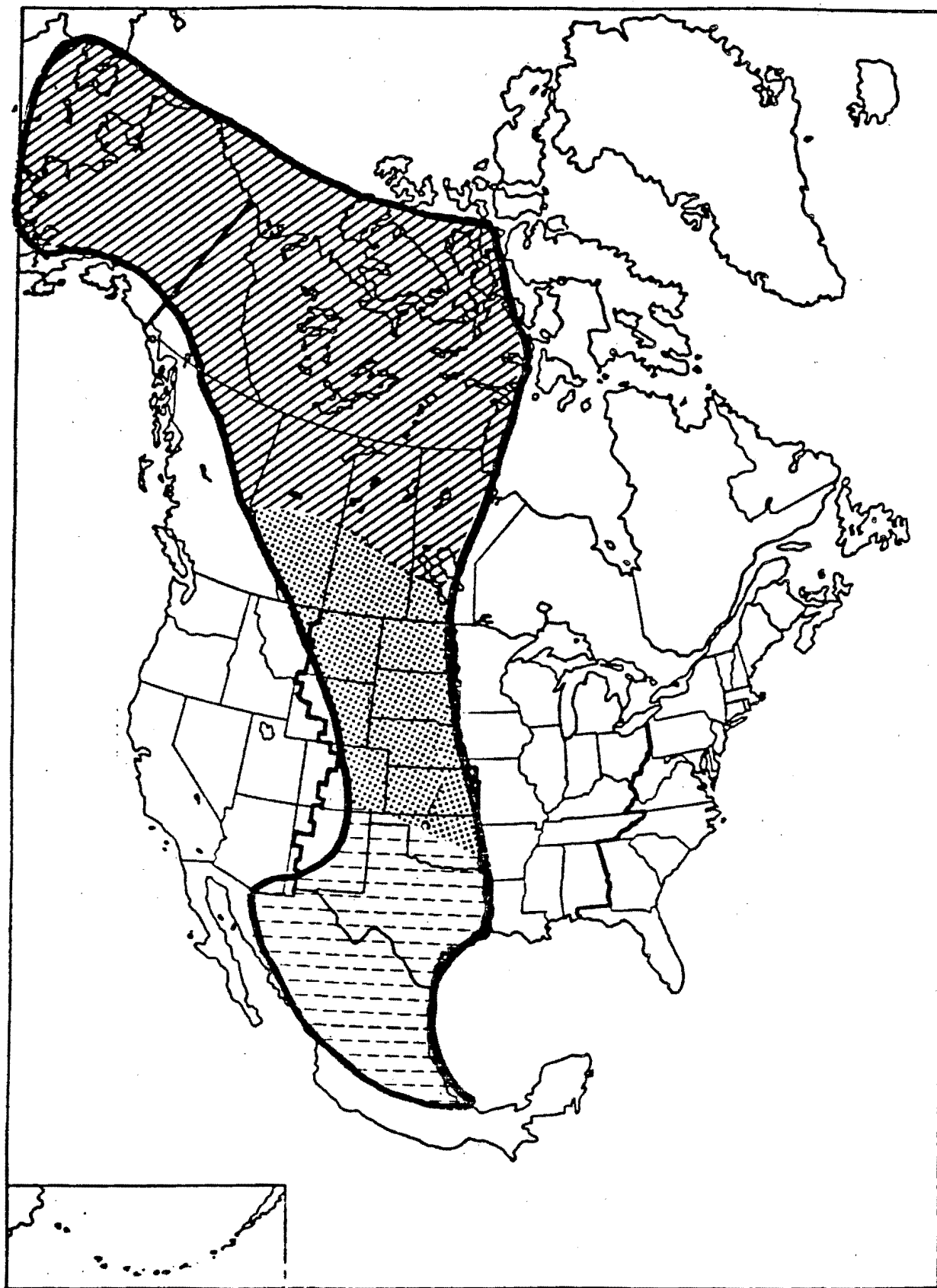
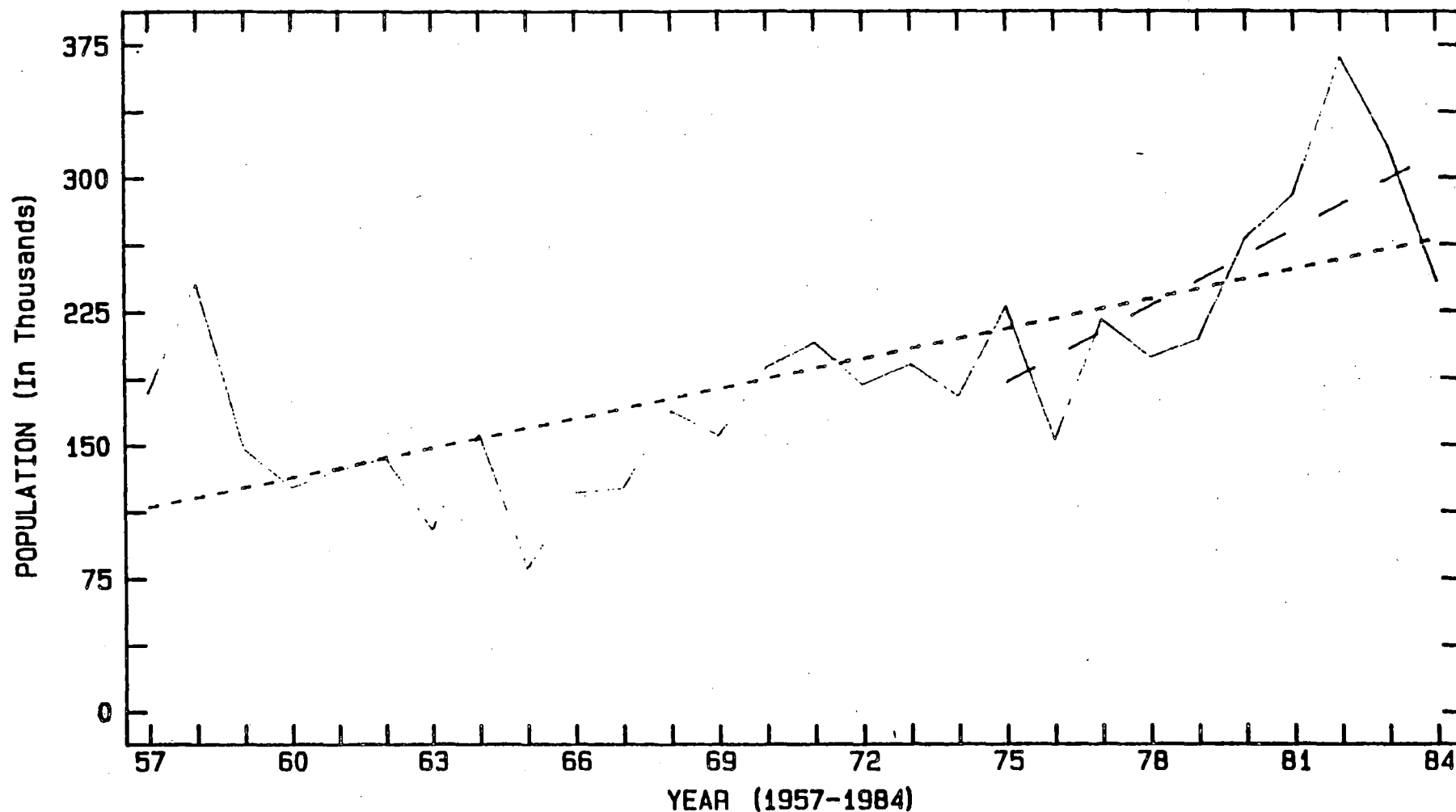


Figure 1. Breeding, Migration, and Winter Distribution of MCP Sandhill Cranes.

# FIGURE 2. MID-CONTINENT SANDHILL CRANE POPULATION

(COORDINATED SPRING SURVEY DATA) \*



\* ESTIMATES FOR 1957-1973 FOR NEBRASKA ONLY;  
ESTIMATES FROM 1974-1984 INCLUDE ND, SD, NE, KS, CO, OK, NM, TX

DATA PLOT

LONG TREND  
cc= .679  
se= 48

SHORT TREND  
cc= .686  
se= 49

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE MALLARD

### Purpose

This document communicates the objectives, strategies, and priorities for U.S. Fish and Wildlife Service activities for nationwide management of the Mallard (Anas platyrhynchos) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead group for this plan was the Office of Migratory Bird Management with support from Regions 1-7.

### Continental/National Objectives

- . Achieve a breeding population index that reaches or exceeds 8.7 million Mallards in survey areas (3 million in U.S.), with corresponding objectives of: 10.9 million breeding Mallards in surveyed and unsurveyed areas combined; fall flight indices of 15.4 million and 19.2 million Mallards from surveyed areas and all areas respectively; and reported Mallard harvests of 4.8 million in the U.S. and 1.7 million in Canada (Table 1, Figure 1).

### Flyway Objectives

Flyway objectives are being developed.

### FWS Regional Objectives

- . Region 1 will achieve a fall flight of 1.8 million Mallards with partial wintering distribution of birds among the Columbia Basin drainage (500,000), Snake River drainage (500,000), Puget Sound (50,000), Interior Basin (50,000) and Central Valley (500,000), and maintain an annual reported harvest of 960,000.
- . Region 2 will maintain or exceed the most recent 20-year winter population index for Mallards with distribution as follows:

New Mexico		51,000
Oklahoma	- Census Zone 1	53,000
	Census Zone 2	115,000
	Census Zone 3	50,000
Texas	- Census Zone 1	305,954
	Census Zone 2	60,000
	Census Zone 3	46,000

- . Region 3 shall obtain by 1989 a breeding population index of 572,000 Mallards in surveyed areas and maintain that level through 1994, maintain an annual fall flight of 1 million Mallards, and provide for an annual harvest of approximately 18% of the U.S. harvest.

- . Region 4 shall achieve an annual wintering population index of at least 2 million Mallards through 1988 with a distribution similar to the 1972-80 average winter distribution.
- . Region 5 shall maintain Mallard numbers sufficient to support an average harvest of about 345,000 birds through 1987.
- . Region 6 shall by 1990, increase the Mallard breeding population index to 1.48 million birds in surveyed areas, with a fall flight between 3.7 and 4.6 million birds.
- . Region 7 shall maintain a Mallard breeding population index of 249,000 birds in surveyed areas of Alaska and the Old Crow Flats in the Yukon and maintain existing numbers and distribution of Mallards during the summer in unsurveyed areas as well as in the winter, and maintain optimum sustained hunting opportunities consistent with other objectives.

#### Population Distribution and Status

Distribution - The mallard is the most widely distributed and abundant duck in both field and bag within the U.S. and Canada. It is only of minor importance in Mexico. Breeding and winter distributions are shown in Figure 2.

Status - Breeding population indices from surveyed breeding areas in the U.S. and Canada averaged 8.3 million mallards during 1955-1985, and ranged from a low of 5.5 million in 1985 to a high of 12.9 million in 1958.

An estimated 5.5 million mallards were in surveyed areas in 1985 - a level of about 37 percent below the objective. There is a slight (-1%/yr.) but statistically significant downward trend.

The estimated sport harvest of mallards during 1974-81 averaged 6.4 million ducks, including 1.6 million in Canada and 4.8 million in the U.S. There were no trends in either country's harvest; however, harvests in Prairie Canada have been diminishing.

Harvest management strategies are aimed at maintaining the population objective in this plan. Very low populations in 1985 have led to more restrictive harvest regulations. Strategies for the use of harvest regulations as one tool for population management are under study by the Service and will be reevaluated at the end of the stabilized regulations analysis in 1986.

#### Rationale for Objectives

The objective of 8.7 million breeding Mallards in surveyed areas, which was established in 1974 as a consensus of FWS, CWS, and the four Flyway Councils and derived from the 1955-74 average index of 8,728,000 mallards, is preferred to previously stated objectives of the most recent 20-year average index of Mallards in the surveyed areas. Most individuals, groups, and agencies commenting on the population objective opposed using an objective that continuously changes and has, in recent years, been diminishing.

On the average, about 80 percent of the breeding population of continental Mallards are believed to be censused by current surveys. The various objectives in this plan are based on the estimates from surveyed areas and harvest and other survey data and are the best extrapolations that can be done at this time. See Table 1 for explanation of rationale for concomitant objectives.

### Problems

Most problems affecting achievement of the population objective are either directly or indirectly related to abundance and quality of habitats. This National Plan summarizes the diverse problems and strategies identified in the 7 RRP's, giving particular emphasis to those having universal application or promise for greatest possibilities of solution. Users of this plan should refer to the 7 RRP's for regional perspectives of problems and strategies for solving them.

Breeding habitat continues to decrease in quantity and quality. In the conterminous United States, over 40 percent of the wetland component has been destroyed. In the Dakotas, about 3 percent of the remaining wetlands are destroyed annually. Upland nesting cover in most of the United States continues to be destroyed and degraded by intensification of land uses. In the Coteau du Missouri counties of North Dakota, about one-half of the rangeland was converted to croplands during 1965-75. In eastern Montana, over 2 million acres of rangeland reportedly were converted to croplands in 1982-83. In Canada, loss of wetlands has been slower but follows the same pattern as in the United States.

Migration habitat is considered adequate to achieve population objectives. The distribution and probably the harvest of mallards are being changed by the creation of wetlands, such as reservoirs in some areas, while wetlands in other areas are being degraded and destroyed.

Wetlands used by wintering ducks are being destroyed by drainage and filling, and degraded by pollution and development. Major wintering areas such as the flooded bottomland hardwoods of the Mississippi River Delta and the Central Valley Grasslands of California are being converted to croplands. Mallards have adapted to other habitats, such as croplands with drainage ditches or irrigation reservoirs, and the impact of winter habitat losses is unclear. However, loss of such habitat certainly affects distribution and winter survival rates, and may affect productivity.

The problem of suppressed recruitment must be resolved to meet mallard population objectives. Mallards initiate nesting early and are dependent upon residual cover from previous years' growth. Often that growth is destroyed by tillage of croplands or severely degraded by grazing. Nest sites, to which females are committed for at least 35 days, are critical to recruitment and influence survival of nesting hens. Nest success appears to be less than one-half what it was in the 1930's. There are strong indications that in major parts of the U.S. breeding range over 80 percent of the eggs and 20 percent of the hens are destroyed at the nest by predators and farming operations. This situation is a direct result of inadequate amounts, quality, and distribution of breeding habitat that give clear advantage to predators or forces nesting attempts into high risk environments.

Strategies

The following list of Mallard management strategies summarizes those developed in 7 RRP's. The priority for FWS is 1, 2, or 3 which represent high, medium and low levels of priority, respectively.

		<u>REGIONAL PRIORITIES</u>								
		R1	R2	R3	R4	R5	R6	R7	R8	R9
I.	Monitor mallard populations and harvests through range-wide survey and banding programs.	1	1	1	1	1	1	1	-	1
II.	Maintain high quality mallard habitat on lands managed by the FWS, with emphasis on production and wintering habitat.	1	1	1	1	1	1	1	-	1
III	Vigorously enforce MBTA regulations; exercise oversight authority on permit issuance that may impact upon mallards or their habitats.	1	1	1	1	1	1	1	-	1
IV.	Meet FWS wetland acquisition objectives as identified in the 11 national priority categories; encourage acquisition and protection of these lands by other Federal agencies, States, organizations or individuals. The national priority for mallards is:									
1.	Prairie Potholes and Parklands	-	-	1	-	-	1	-	-	1
2.	Central Valley	1	-	-	-	-	-	-	-	1
3.	Lower Mississippi River Delta and Red River basin	-	-	-	1	-	-	-	-	1
4.	Upper Mississippi River and northern lakes	-	-	1	-	-	-	-	-	1
5.	Northern Great Plains	-	-	-	-	-	1	-	-	1
6.	Alaska Areas	-	-	-	-	-	-	1	-	1
7.	Intermountain west	2	2	-	-	-	2	-	-	3
8.	Columbia Basin and SW Idaho	1	-	-	-	-	-	-	-	3
9.	Klamath Basin	2	-	-	-	-	-	-	-	3

				<u>REGIONAL PRIORITIES</u>					
	R1	R2	R3	R4	R5	R6	R7	R8	R9
10. West-central Gulf Coast	-	1	-	1	-	-	-	-	1
11. Ongoing refuge acquisitions	3	3	3	3	3	3	3	-	3
V. Provide incentives for maintenance and enhancement of mallard habitat on privately owned lands.	1	1	1	1	1	1	1	-	1
VI. Enhance mallard habitat, especially in nesting areas, on non-FWS lands through extension education activities, cooperative agreements, etc.	1	1	1	1	1	1	1	3	1
VII. Reduce non-hunting loss of mallards by implementing oil spill and disease contingency plans, managing lands to lessen impacts from epizootic diseases, requiring use of non-toxic shot in lead poison problem areas, etc.	1	1	1	1	1	1	1	-	1
VIII. Examine population and harvest surveys to determine whether estimates can be refined to produce better information.	-	-	-	-	-	-	-	1	1
IX. Initiate or emphasize research on mallards to:									
A. Evaluate impact on survival and recruitment of wintering habitat losses and degradation.	2	2	-	2	-	3	-	1	2
B. Determine whether and to what degree hunting mortality is compensatory, and whether thresholds exist above which hunting mortality is additive.	-	-	-	-	-	-	-	1	2
C. Identify factors affecting duckling survival rates.	2	-	1	-	-	1	3	1	2
D. Determine whether disease losses can be reduced through management.	2	2	2	2	2	2	2	1	3
E. Determine proper use of agricultural tile-drain water for marsh management in the Central Valley of California.	2	-	-	-	-	-	-	1	3

	R1	R2	REGIONAL PRIORITIES							R9
			R3	R4	R5	R6	R7	R8		
F. Increase the utility of the "mallard management model" to other geographic areas.	2	3	2	3	3	2	2	1	2	
G. Determine socio-economic values of mallard production on privately-owned lands.	3	-	2	-	-	2	3	1	-	
X. Develop depredation control methods to alleviate complaints by private landowners.	2	2	1	2	2	1	3	3	1	
XI. Coordinate intra-Regional and flyway management efforts with State agencies during periodic meetings of the Flyway Councils and their technical committees.	1	1	1	1	1	1	1	2	1	
XII. Coordinate mallard management with Canada through periodic meetings between FWS and CWS.	-	-	-	-	-	-	-	-	1	

### Implementation

The objectives and strategies in this Plan are consistent with FWS Regional Resource Plans (RRPs) developed by Regions covering portions of the mallard's range. The Regions will use the detailed operations plans in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Service Regional Resource Plans of Regions 1-7.

### For Further Information Contact:

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240; 202/254-3207.

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Table 1. Current and objective levels for mallard harvest, breeding population and fall flight. <sup>1/</sup>

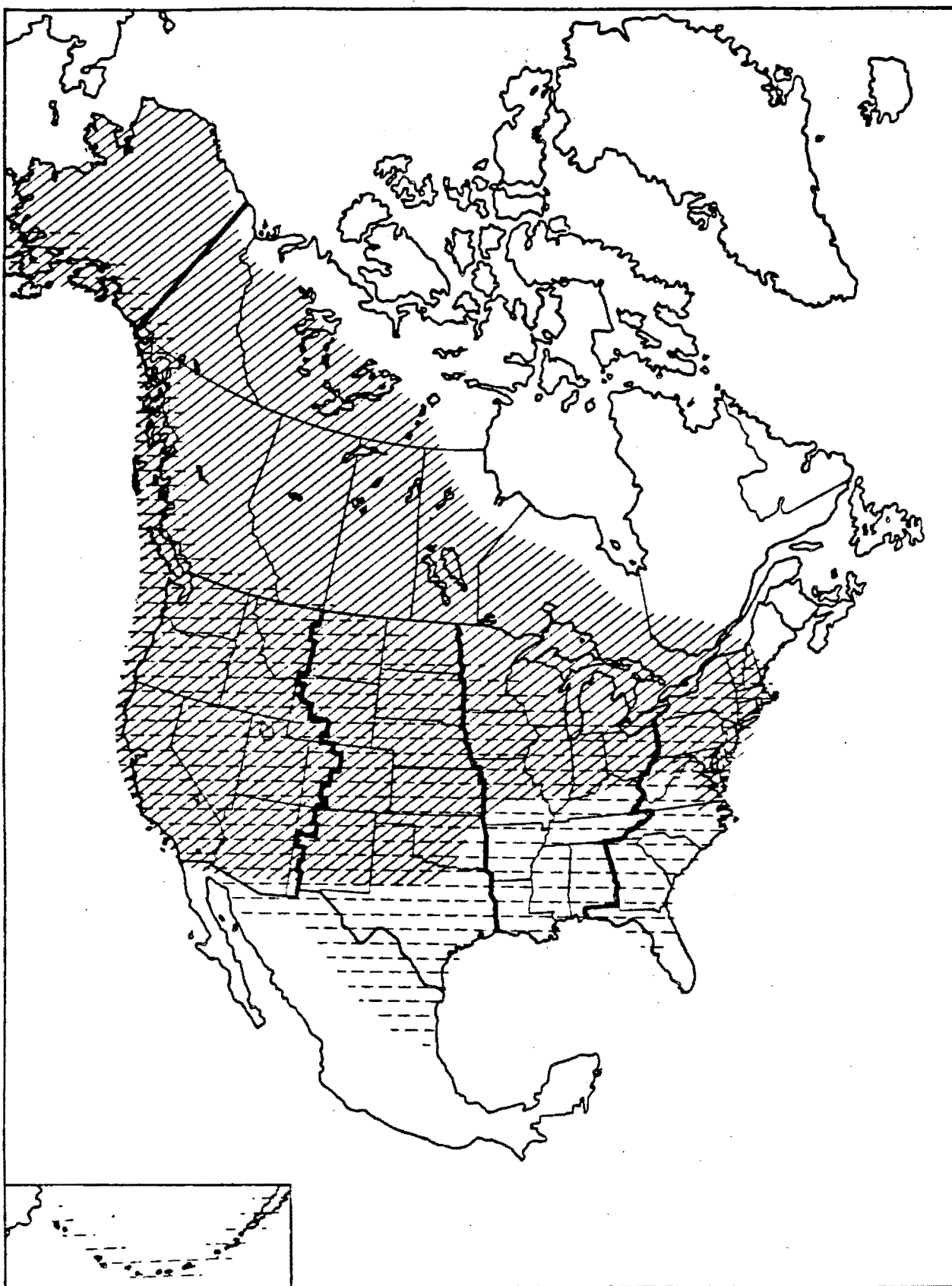
	Current Level			Objective Level		
	U.S.	Canada	Total	U.S.	Canada	Total
Harvest <sup>2/</sup>	4,670,000	1,480,000	6,100,000	4,800,000	1,700,000	6,500,000
Breeding Population Index <sup>3/</sup>	2,000,000	5,700,000	7,700,000	3,000,000	5,700,000	8,700,000
Fall Flight Index <sup>4/</sup>			13,000,000	6,700,000	8,700,000	15,400,000

<sup>1/</sup> The Harvest, Breeding Population, and Fall Flight Objectives were developed independently by the FWS and, therefore, without assurance of concurrence by either Flyway Councils or Canada.

<sup>2/</sup> The current level of harvest is the approximate 3-year average (1979-81) of the estimated retrieved sport harvests in Canada and the U.S. Subsistence harvests in both countries are not measured and, therefore, not included. The objective level of harvest is the approximate averages of the retrieved harvests during the 8-year period of 1974-81.

<sup>3/</sup> Current level of the index is the 3-year average of birds in surveyed areas. The period 1979-81 was used. The objective level, based upon indices within surveyed areas, was established in 1974 as a consensus of Flyway Councils and others and has been reaffirmed at subsequent Waterfowl Status Meetings. That objective for mallards was derived from the 1955-74 average index of 8,728,000 birds which was rounded to 8.7 million birds.

<sup>4/</sup> The current fall flight index is the approximate 3-year average (1979-81) for the period 1979-81.





 BREEDING  
 WINTERING

Figure 1. Breeding and Winter Distribution of Mallards.

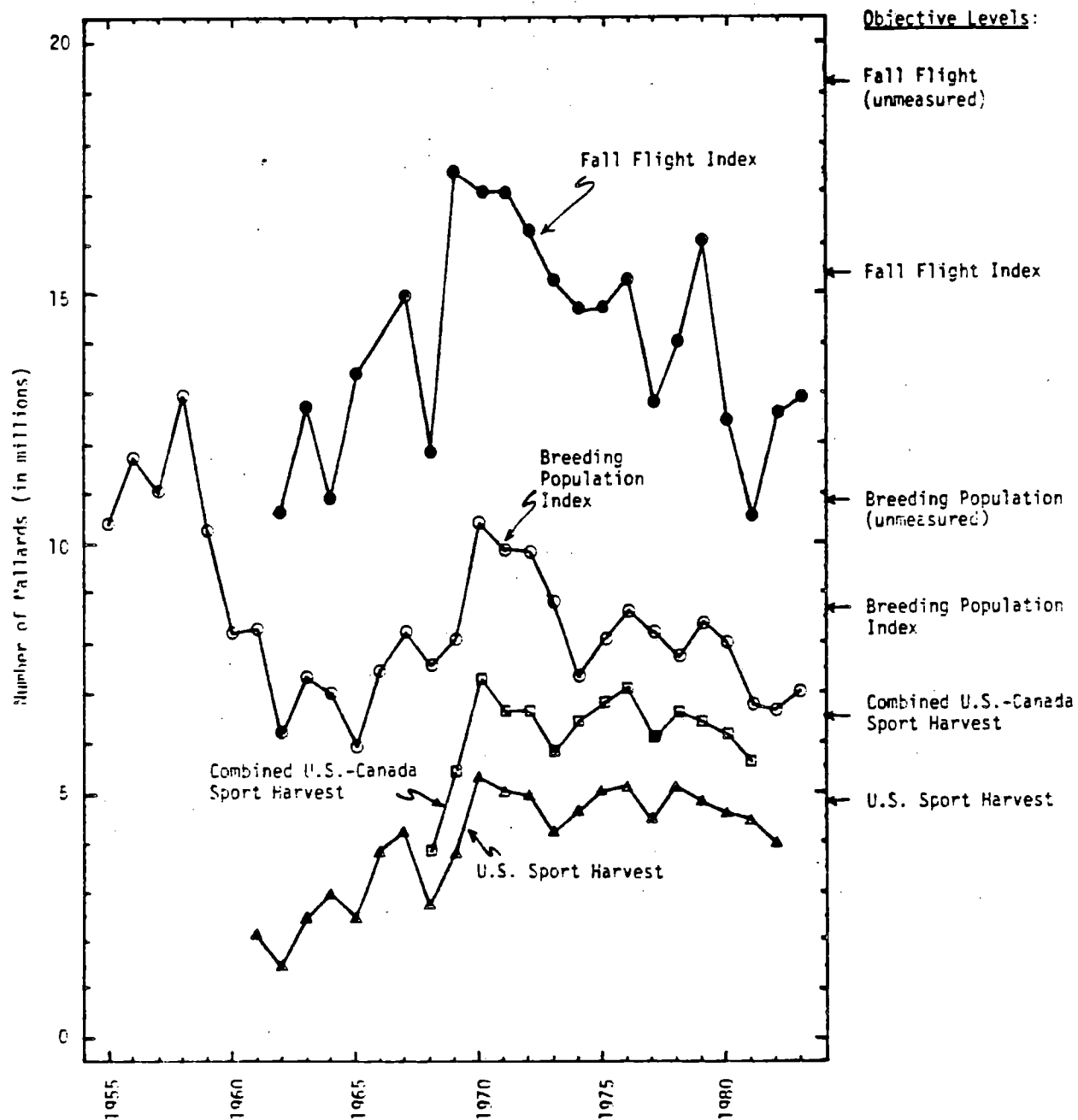


Figure 2. Historic and objective levels for various parameters of the North American Population of the mallard (see Table 1 for criteria and rationale).

MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE  
PACIFIC FLYWAY POPULATION OF SANDHILL CRANES

Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Pacific Flyway Population (PFP) of the Lesser Sandhill Crane (Grus canadensis canadensis) that were developed through the Regional Resource Planning process of the U. S. Fish and Wildlife Service (FWS). Lead Office for this plan is Region 7 with support from Region 1.

National Objectives

The breeding, migration, and wintering distributions of these sandhill cranes are limited to the Pacific Flyway (See Pacific Flyway Objectives).

Pacific Flyway Objectives

- . To maintain production, migration, and wintering habitat for lesser sandhill cranes in adequate quantity and quality to support the population at levels and distribution shown in Figure 1 and listed in Table 1. (Because relationships between production, migration, and wintering areas are poorly defined, the objective for distribution as listed in Table 1 will be changed pending results from banding investigations and population surveys.)
- . To maintain consumptive and nonconsumptive uses of this population at their current levels. (Changes in levels of use would be dependent upon definitive estimates of population status.)

These objectives were recommended by the Pacific Flyway Study Committee to the Flyway Council, but they have not been reviewed and endorsed by the government of Canada which shares management responsibilities for this population.

Regional Objectives

- . To maintain the wintering population of lesser sandhill cranes in Region 1 at the current level of an estimated 20,000 to 25,000 birds. (This objective may be modified pending results from more complete inventories of the population).

Population Distribution and Status

Distribution - The lesser sandhill crane nests throughout northcentral and northwestern Canada, Alaska, and the extreme northeastern portion of the U.S.S.R. They winter in southern portions of both the Pacific and Central Flyways. Relationships between breeding areas, migration routes, and wintering areas are poorly defined. Nesting areas used by those lesser sandhill cranes wintering in California have not been confirmed by banding or color-marking information. They are presumed to be the lowlands of Alaska's

Bristol Bay and Upper Cook Inlet where an estimated 8.3% and 0.3%, respectively, of the 1957-80 average of cranes from surveyed areas are found (Figure 1).

Pacific Flyway cranes wintering within the Central Valley of California are separated into two distinct groups or sub-populations (Figure 1, Table 1). The smallest and northern-most group (about 1400 birds) winters approximately 4 miles east of Red Bluff, Tehama County. The southern group, about 20,000 to 24,000 birds, winters from near Thornton, just north of Lodi, southeast to the Carrizo Plains in San Luis Obispo County. A majority of this group winters on and near Merced and San Luis National Wildlife Refuges, but during the winter of 1979-80 large numbers wintered in the Delta-Grizzly Island area.

Status - Because both PFP lesser sandhill cranes and the Central Valley Population of greater sandhill cranes (Grus canadensis tabida) winter in some of the same areas, they cannot be readily distinguished from each other. Estimates of population sizes are not easily obtained.

Numbers of PFP cranes at primary migration stop-over areas and wintering areas are listed in Table 1. The 1957-80 average is 28,800 birds. The primary use of PFP cranes is nonconsumptive, i.e., bird watching and photography on wintering grounds and along migration routes. Legal hunting of PFP cranes occurs only in Alaska and only since 1971. The 10-year average harvest of cranes in Alaska was 766, with an estimated 229 cranes being PFP birds and the remaining 537 belonging to the mid-continent population. Subsistence harvest of the PFP is believed to be proportionately less than that of the mid-continent population. Hunting of PFP cranes is prohibited in all other Pacific Flyway States and in British Columbia.

#### Rationale for Objectives

The objective statements for PFP of lesser sandhill cranes in this plan are designed to maintain nesting and wintering populations as well as harvest and nonconsumptive uses at current levels.

#### Problems

Lack of Life History Data - The principal problem concerning PFP of lesser sandhill cranes is the inability to make informed decisions due to inadequate information on life history of the species. The breeding origin of the PFP of lesser sandhill cranes and most northern migration routes and stop-overs to and from California are not well known. Stop-over areas and their relative importance to cranes have only been cursorily identified. Similarly, population estimates are not sufficiently accurate for management needs. Information on breeding biology, habitat requirements and population dynamics is limited.

Spring and Summer Subsistence Harvest - Spring and summer subsistence harvest of the PFP occurs in Alaska, but the magnitude and consequence of the harvest is not well known. The only subsistence harvest data available is for the Yukon-Kuskokwim Delta, a prime nesting area for the mid-continent population of sandhill cranes.

Habitat Destruction and Disturbance in Alaska - Outer continental shelf petroleum development may degrade habitats of PFP and the mid-continent crane populations. Outer continental shelf oil and gas lease sales adjacent to lesser sandhill crane habitats include: Hope, Norton, Navarin, St. Matthew/Hall, and St. George Basins, and Cook Inlet. Onshore petroleum exploration and development may also be a problem, especially in the upper Cook Inlet area.

Loss or alteration of habitats could occur from reindeer husbandry on the Yukon-Kuskokwim Delta and Seward Peninsula areas, hydropower projects in the Susitna River Basin and strip mining in Upper Cook Inlet.

Habitat Loss in California - The principal problems on wintering areas in California are related to decreasing water supplies and resultant wetland loss as well as loss of wetland habitat to development or agriculture in the Central Valley. Presently wildlife is given a low priority when water resources are scarce.

### Strategies

The following list of PFP lesser sandhill crane management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium and low priority, respectively.

### REGIONAL PRIORITIES R1 R7 R8 R9

#### I. Increase Research Projects

- |  |   |   |   |   |
|--|---|---|---|---|
| A. Institute productivity and nesting success studies in the Bristol Bay area (Figure 1), the major nesting area for PFP sandhills.  | - | 2 | 2 | - |
| B. Develop survey methods on nesting grounds to predict annual productivity. Attempt to relate habitat to productivity.  | - | 1 | 1 | - |
| C. Review results of current banding efforts. Orient the banding program to identify other nesting areas for PFP sandhills and to better understand importance of breeding areas, migration areas, and wintering areas.          | 2 | 1 | 2 | 2 |
| D. Encourage field studies designed to evaluate the effect of reindeer grazing on habitats important to PFP sandhills. Develop information needed to document the effects before commercial reindeer operations are implemented. | - | 3 | 2 | - |

July 1985

REGIONAL PRIORITIES  
R1 R7 R8 R9

E. Institute surveys on wintering areas of PFP to estimate the percent of young of the year.	1	-	-	2
II. Assess condition of Breeding Grounds				
A. Evaluate the potential for onshore and off-shore oil development and hydropower development that will impact important breeding and migration areas. Concentrate efforts on mitigating effects of development on areas in imminent danger.	3	1	-	-
B. Determine the relative importance of breeding and migration areas on National Wildlife Refuge (NWR) lands.	2	1	-	-
C. Identify breeding and migration areas outside of NWR lands. Determine the relative importance of these areas and develop strategies for protection if needed.	2	1	-	-
D. Evaluate the potential for commercial reindeer operations on NWR lands important to PFP lesser sandhill cranes. Identify areas where grazing should be prohibited.	-	2	-	-
3. Improve Wintering Habitat Acquisition and Protection				
A. Institute surveys of known migration areas to determine relative importance of each to the PFP.	1	2	-	2
B. Encourage acquisition or protection of quality wintering habitats by states and private organizations.	1	-	-	2
C. Closely monitor agricultural and developmental activities on wintering grounds.	1	-	-	-
D. Encourage policy changes that would give wildlife a higher priority for water use during droughts.	2	-	-	2
IV. Improve Mortality/Recruitment Data				
A. Determine if any subsistence harvest is occurring on major known nesting areas of PFP (Bristol Bay).	-	1	-	2

July 1985

REGIONAL PRIORITIES  
R1 R7 R8 R9

B. If other important nesting areas for PFP sandhills are identified, determine the magnitude of subsistence harvest and the relative impact on the PFP.	-	2	-	2
C. Develop regulations that provide for adequate protection of the population.	2	2	-	1
D. Work toward amending the Migratory Bird Treaty with Canada to allow regulation of subsistence harvest.	2	2	-	1

Implementation

The objectives and strategies presented in this plan were derived from the Regional Resource Plan (RRP) developed by regions covering portions of the PFP Lesser Sandhill Crane range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 1 and 7.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Principal locations used by the Pacific Flyway Population (PFP) of Lesser Sandhill Cranes, use of those areas, and estimated numbers of cranes. Map numbers correspond to locations shown on Figures 1, 2 and 3.

Map Number	Location	Use by Cranes	Estimated Number of Cranes and Remarks
<b>ALASKA</b>			
1	Bristol Bay Lowlands	Nesting	Unknown numbers; presumably the major breeding grounds for PFP cranes
2	Upper Cook Inlet-Susitna River Marshes	Limited nesting; major migration stopover	100 cranes were estimated in waterfowl breeding surveys; 10,000+ cranes estimated in spring and fall; Portage Flats are particularly important stopover point
3	Copper River Delta	Major migration stopover	20,000+ cranes in spring and fall
4	Icy Bay, Yahtse River, and Yakutat Bay	Migration stopover	Unknown
5	Gustavus Area	Migration stopover	Unknown
6	Blind Slough	Migration stopover	Unknown
7	Stikine River Delta	Migration stopover	Unknown
<b>BRITISH COLUMBIA</b>			
8	Okanagan Valley	Migration stopover	Unknown
<b>WASHINGTON</b>			
9	Okanagan County	Migration stopover	1,200 in October 1978
10	Douglas County	Migration stopover	950 cranes in September 1978
11	Grant County	Migration stopover	1,000 cranes at Banks Lake October 1967
12	Lincoln County	Migration stopover	Numerous records
13	Ridgefield NWR, Cowlitz County	Migration stopover	Birds stopping on Sauvies Island, Oregon, frequently use this area.

## OREGON

14	Sauvies Islands, Columbia County	Migration stopover	1,400 cranes
15	Malheur-Harney Lakes area, Harney County	Migration stopover	Major stopover point; 14,000+ cranes
16	Warner Valley, Lake County	Migration stopover	10,000+ cranes
17	Goose Lake, Lake County	Migration stopover	4,000+ cranes

## CALIFORNIA

17	Goose Lake, Modoc County	See above	See above
18	Meiss Lake	Migration stopover	Unknown
19	Red Bluff, Siskiyou County	Wintering	About 1,400 cranes winter in what is probably a distinct subpopulation <sup>1/</sup>
20	Honey Lake, Lassen County	Migration stopover	10,000+ cranes
21	Thornton, San Joaquin County	Wintering	4,100 cranes in winter 1969-70 <sup>1/</sup>
22	Modesto, Stanislaus County	Wintering	2,400 cranes in winter of 1969-80 <sup>2/</sup>
23	Merced County	Wintering	9,300 cranes in winter of 1969-70 <sup>1/</sup>
24	Kings County	Wintering	325 cranes in winter of 1969-70 <sup>1/</sup>
25	Pixley NWR, Tulare County	Wintering	8 cranes in winter of 1969-70 <sup>1/</sup>
26	Goose Lake, Kern County	Wintering	<del>630</del> <sup>1/2/</sup> cranes in winter of 1969-70
27	Carrizo Plains, San Luis Obispo, California	Wintering	2,765 cranes in winter of 1969-70 <sup>1/</sup>

<sup>1/</sup> Examination of these areas in 1970, 1971, and 1976 showed they were still being used by lesser sandhill cranes in about the same numbers as during the survey of 1969-70.

<sup>2/</sup> During 1978 and 1979, respectively, peak populations were 1,300 (13 December) and 1,200 (14 December).

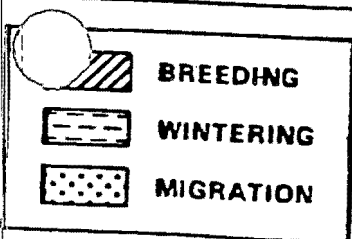
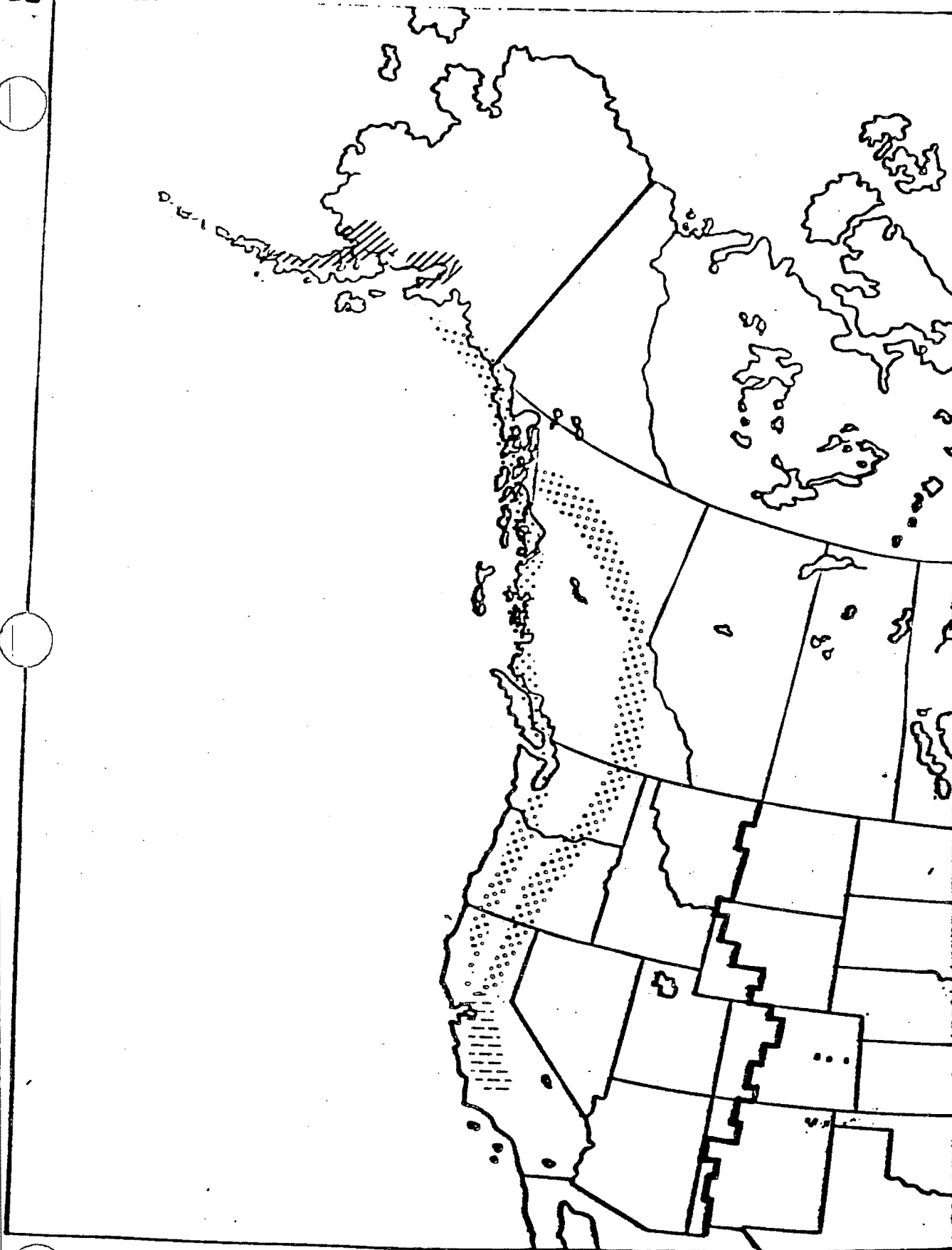


Figure 1. Breeding, Wintering and Migration areas of PFP of lesser sandhill cranes

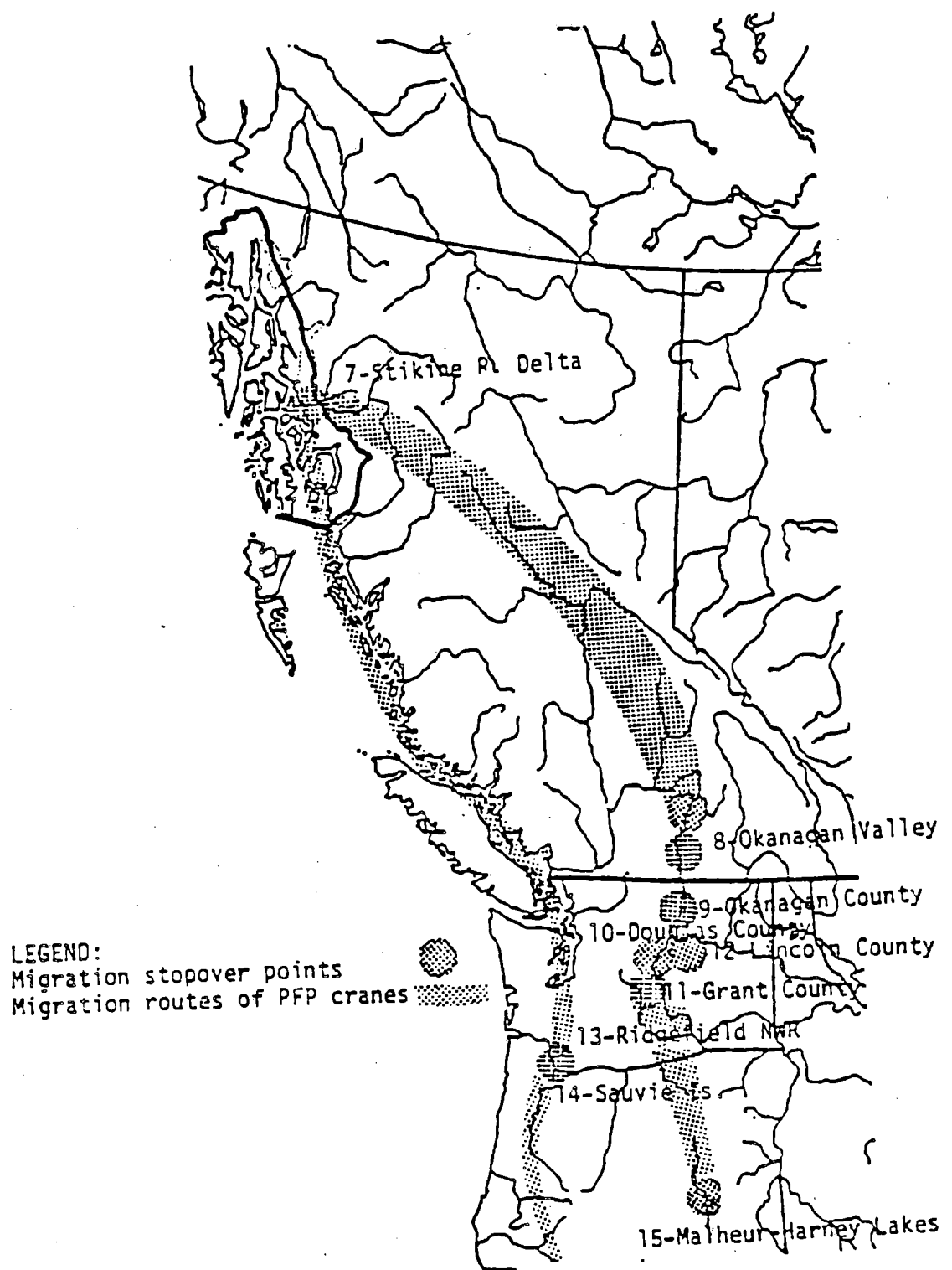


Figure 2. Migration routes and stopover points of the Pacific Flyway Population of lesser sandhill cranes.

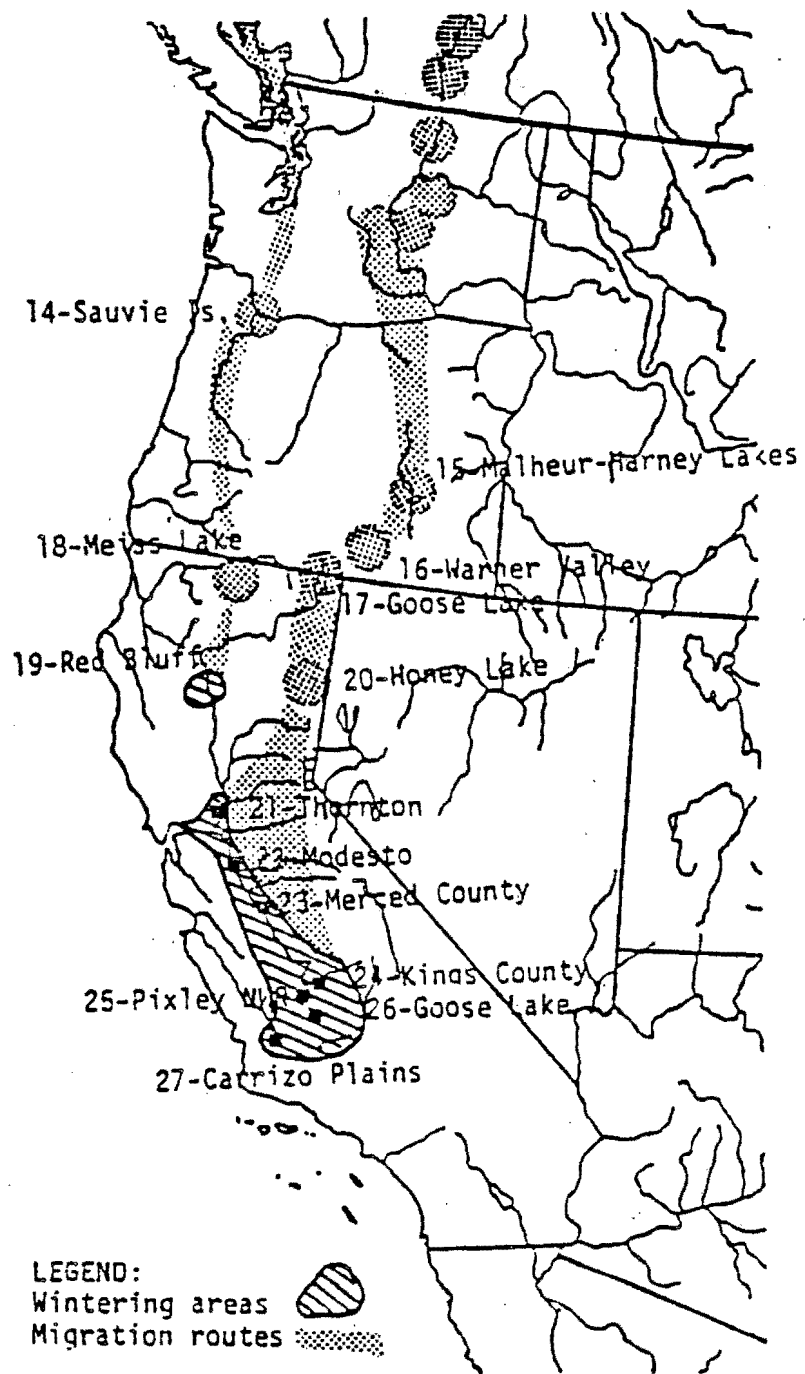


Figure 3. Migration routes, stopover points and wintering areas of Pacific Flyway Population of lesser sandhill cranes.

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE OSPREY

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Osprey (Pandion haliaetus) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead Office or Region for this plan is Region 5 with support from all other Regions, Research and the Migratory Bird Management Office.

### National Objectives

- . Maintain the abundance and distribution of osprey breeding populations at not less than 7,400 breeding pairs within the contiguous United States.
- . Maintain the abundance and distribution of osprey breeding populations at the current estimated minimum level of 200 breeding pairs in Alaska.
- . Achieve a minimum average annual productivity of 1.0 fledgling per nesting pair.
- . Establish and maintain disjunct breeding populations in areas capable of supporting at least five breeding pairs (See section on Rationale For Objectives, Page 2).

### Regional Objectives

USFWS regional population objectives, expressed in terms of number of breeding pairs, are presented in Table 1.

### Population Distribution and Status

**Distribution** - The osprey has a worldwide distribution. Its principal breeding range in the Western Hemisphere occurs within the conterminous U.S., southern Canada and Baja, California. Osprey wintering range extends from central California, southern Texas and Florida south through central South America.

Osprey nesting distribution in the U.S. occurs in six rather discrete regions and represents roughly 7,400 pairs. These can be identified from Figure 1: Florida and East Gulf Coast (1,550 pairs), Atlantic Coast including interior Maine and New York (3,600 pairs), Western Great Lakes (575 pairs), Northern Rocky Mountain States (600 pairs), and the Pacific Northwest (850 pairs). In Alaska, the osprey is thinly distributed as a breeding species south of the Brooks Range where only two nesting concentrations are known (Figure 2). The Alaskan breeding population is estimated at 200 pairs.

**Status** - Formerly, significant numbers of ospreys nested on the southern California mainland and Channel islands. No nesting has been reported since 1968. The loss of the southern California population is the only significant regional loss to occur in recent

times. Other losses have occurred outside the principal breeding range, but these have affected only small disjunct nesting populations. For example, historical records show that ospreys occasionally nested in Texas. No evidence of this has occurred since 1967-68.

Organochlorine pesticides severely reduced populations along the Atlantic Coast and the Great Lakes prior to 1970, but the osprey is now recovering in both areas. In western states, especially in the western interior, large reservoirs have allowed range expansion and perhaps population increases. However, a strong fidelity to ancestral breeding areas (short dispersal distance) has slowed range expansion. Introductions of ospreys to reservoirs distant from established breeding populations are now being made and followed with intense interest. Regional populations are now productive throughout the United States, but some local populations may still be adversely affected by pesticide-induced reproductive failures.

The lack of consistent and comparable data from region to region on the status of the osprey in terms of number of breeding pairs, distribution, nesting success, and levels of pesticide contamination in eggs adversely influences the accuracy of population status data.

#### Rationale for Objectives

The osprey population is increasing and habitat is available for further increase. In spite of this, objectives are not high because banding data suggests that ospreys have a limited ability to pioneer into new habitats. Only 6 percent of ospreys nest beyond 78 miles of their hatching place. The probability of natural pioneering from the same or adjacent populations beyond 150 miles would be considered small. Furthermore inbreeding may limit the reproductive potential of ospreys in disjunct populations, and small disjunct breeding groups are vulnerable to loss. Given an annual adult survival rate of .815, the probability that a single pair would survive five years is .129. In a group with five pairs, the probability that at least one pair will survive 5 years increases to .736. This assumes no recruitment.

#### Problems

Contaminants - Organochlorine pesticides (primarily DDE, a metabolite of DDT) have been responsible for reproductive failures resulting in catastrophic population declines of ospreys. Other organochlorines, such as dieldrin, have caused mortality of adults. Although use of these substances has been largely banned within the U.S. and Canadian breeding range, they continue to be used in Latin America.

The extent to which ospreys are exposed to these and other pesticides in wintering habitats is unknown. Lethal and sublethal bioaccumulation of pesticide residues in ospreys within Latin American winter range poses a substantial, but unknown risk to the health of U.S. breeding populations.

Human Disturbance - Osprey habitats often have recreational and commercial value. This species has shown a high tolerance to man and often adapts to his environment where protected from vandalism and provided with an adequate uncontaminated food

supply. Additional management efforts may be required to minimize disturbance near active nesting sites and provide adequate foraging areas.

### Strategies

The following list of osprey management strategies is indexed by priority for FWS regions. The priority 1, 2 and 3 represents high, medium and low priorities, respectively.

	REGIONAL PRIORITIES									
	R1	R2	R3	R4	R5	R6	R7	R8	R9	
I. Determine and monitor regional nesting populations and nesting success.		1	1	1	1	1	1	2	-	1
II. Encourage states and private organizations to continue ongoing restoration efforts.		3	2	1	2	2	2	2	-	2
III. Continue to analyze eggs and food for organochlorine residues and other contaminants as needs dictate.		3	-	3	-	3	3	-	1	-
IV. Provide additional habitat protection through law enforcement, increased public education, human exclusion measures and habitat acquisition.		3	-	2	2	2	-	-	-	-
V. Provide nesting structures.		3	-	3	-	-	-	-	-	-
VI. Apply fish management measures for prey species.		3	-	3	-	3	-	-	-	-
VII. Improve water quality of feeding areas.		3	-	3	-	3	-	-	-	-

### Implementation

The objectives and strategies in this plan are consistent with the FWS Regional Resource Plans (RRPs) developed by Regions covering portions of the national osprey range. The Regions will use the detailed operations plans contained in their RRP's to implement the strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Regional Resource Plans for Regions 1 through 7 and from related State osprey plans.

July 1985

For Further Informatin Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240 (202) 254-3207.

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.



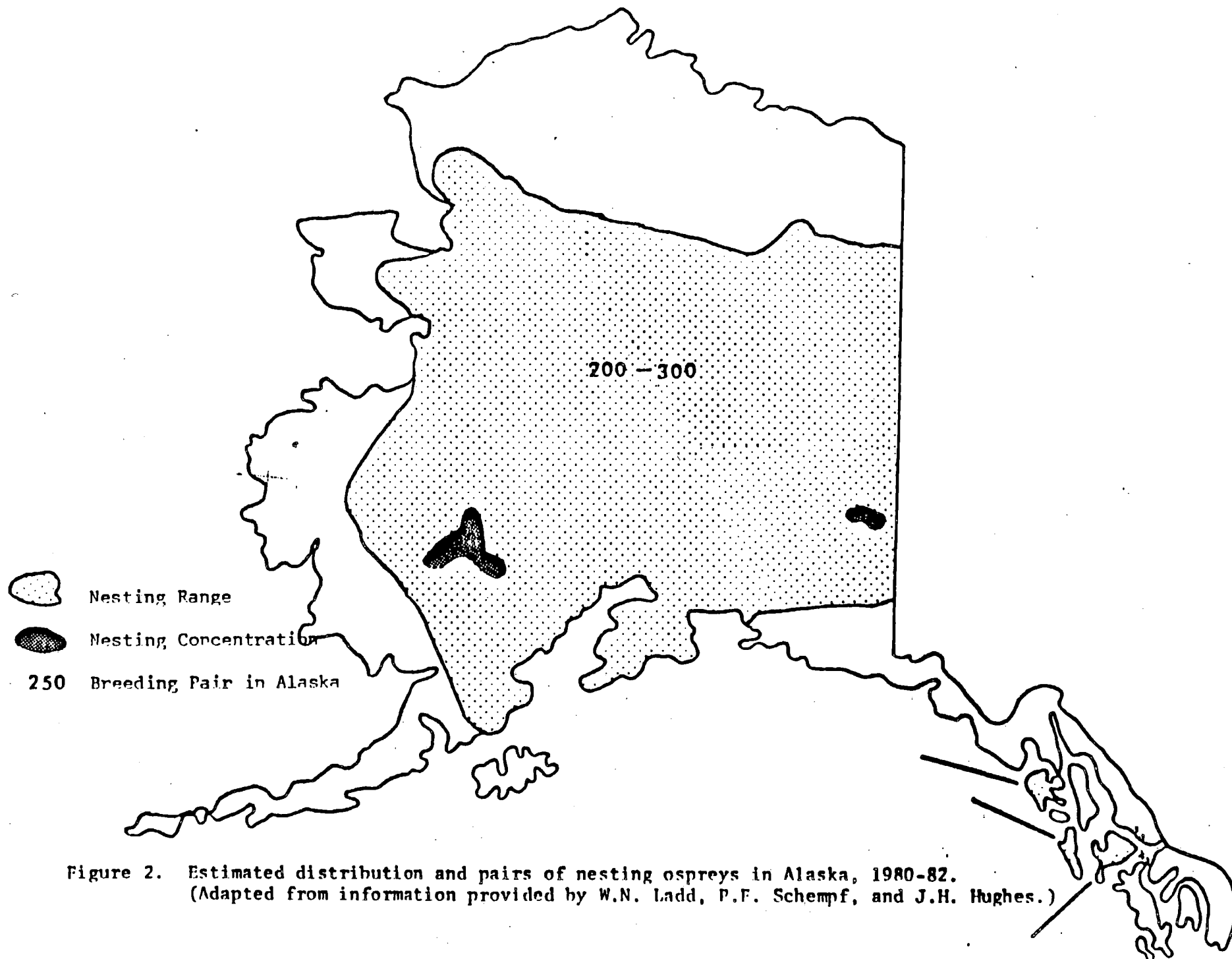


Figure 2. Estimated distribution and pairs of nesting ospreys in Alaska, 1980-82.  
(Adapted from information provided by W.N. Ladd, P.F. Schempf, and J.H. Hughes.)

MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE  
ROCKY MOUNTAIN POPULATION OF TRUMPETER SWANS

Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Rocky Mountain Population (RMP) of Trumpeter Swans (Cygnus buccinator) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service and the Pacific Flyway Plan for Trumpeter Swans. Lead Region for this plan is Region 1 with support from Region 6.

Continental/National Objectives

1. Maintain a wintering population of at least 1,100 wintering swans within the Tristate region of Idaho, Montana, and Wyoming.
2. Expand the distribution of swans wintering and nesting in the Tristate region by establishing a tradition of use at a minimum of four new winter sites within Montana, Wyoming, and eastern Idaho. Each site should have the capability of wintering 50-150 swans. By 1990 evaluate and attempt establishment on at least two sites and by 2000, two more sites.
3. Achieve and maintain a breeding Rocky Mountain Population in the Tristate and Interior Canada Subpopulations of at least 183 active nests with an approximate distribution as follows:

Montana

30 nests at Red Rock Lakes NWR  
8 nests elsewhere in the Centennial Valley  
5 nests at other sites

Idaho

15 nests within the Targhee NF  
10 nests at other sites

Wyoming

20 nests within Yellowstone NP  
10 nests at other sites

Canada (Canadian responsibility)

85 nests at various specified locations

4. Maintain all current wintering Trumpeter Swan habitat in the Tristate area to protect habitat integrity.

5. Except as determined to be necessary for the winter maintenance of swans at Red Rock Lakes NWR, do not supplemental feed or provide artificially maintained ice-free water areas for any wintering swans of the Rocky Mountain Population.

#### FWS Regional Objectives

##### Region 1

1. Maintain a minimum wintering population of 300-400 adult birds on Henry's Fork of the Snake River and 50 adult birds at other sites in Idaho.
2. Establish among those swans that normally winter within the Tristate area a tradition for wintering at one new site with a population of 50-150 adults by the year 1990 and another site by 2000.
3. Maintain a breeding population of at least 25 active nests in Idaho.

##### Region 6

1. Maintain a minimum wintering population of 200-250 adult birds at Red Rock Lakes NWR and 100 adult birds at other sites in Montana and Wyoming.
2. Establish among those swans that normally winter within the Tristate area a tradition for wintering at one new site with a population of 50-150 adults by the year 1990 and another site by 2000.
3. Maintain a breeding population of at least 30 active nests at Red Rock Lakes NWR and 43 active nests at sites elsewhere in Montana and Wyoming.

#### Population Distribution and Status

Distribution - Trumpeter Swans were once distributed across the continent and were well known to early explorers. The trappers of the north and homesteaders of the plains, living as they did off the resources of the land, exterminated the trumpeters from the rich heartland of the U.S. and Canada. By 1933 only 66 trumpeters could be located in the U.S., a nonmigratory population in Yellowstone National Park and adjacent high mountain valleys. Another remnant was known to occur in Alberta, Canada. Though we now find records of trumpeters in Alaska from that time, they were unknown to national conservationists of the 1930's.

The Rocky Mountain Population (RMP) of Trumpeter Swans, as its name implies, is found along and adjacent to the North American cordillera which is dominated by the Rocky Mountains. The RMP is divided into Tristate and Interior Canada Subpopulations because of differences in their breeding distribution and migrational tendencies. (Figure 1)

Status - The Tristate Subpopulation breeds and winters in the Tristate region of Idaho, Montana, and Wyoming and numbers about 400-500 adults and subadults (Figure 2) in summer. The Interior Canada Subpopulation migrates from summering areas principally

in Alberta, eastern British Columbia, and southeastern Yukon and winters in the Tristate region. It numbers about 250-300 adults and subadults in summer.

The restoration flock established at the National Elk Refuge in Wyoming during 1938-41 has integrated with the Tristate Subpopulation. The restoration flock established beginning in 1983 at Elk Island NP in Alberta will be managed as part of the Interior Canada Subpopulation.

### Rationale For Objectives

The objective statements for RMP Trumpeter Swans presented in this plan are designed to increase the Tristate population and establish new breeding and wintering locations in designated areas.

Although definitive information on the nonconsumptive demand for trumpeter swans was not found, a sizeable demand apparently exists. There is a Trumpeter Swan Society.

### Problems

Cygnets Survival - Survival of cygnets in the Tristate area is much lower than in the past and will need be to increased if objectives are to be attained. Disease and parasites seem to be the major cause of cygnets mortality.

Restricted Winter Habitat - The Tristate Subpopulation of the Rocky Mountain Population does not migrate outside of the Tristate area. The amount of winter range is limited and recently, due to the increasing numbers of trumpeters migrating from Canada, its capacity to winter Trumpeter Swans has been exceeded. Both subpopulations are fed in the winter at Red Rock Lakes NWR. The concentration of swans in this small area, where they are artificially maintained during the winter months, is a serious threat to Trumpeter Swan survival. Birds that nest in the Tristate area may not have sufficient nutritional foods available before egg laying and incubation, since the area has so much winter use.

### Strategies

The following list of RMP Trumpeter Swan management strategies is indexed by priority for FWS regions. The priority scale 1, 2, and 3 represents high, medium, and low priorities respectively.

#### REGIONAL PRIORITIES

R1	R6	R9
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### III. Manage Breeding and Wintering Habitat to Benefit Swans.

A. Maintain swan habitats on national wildlife refuges.

1	1	-
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B. Continue winter feeding program on Red Rock Lakes NWR until new wintering sites are established.

-	1	-
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July 1985

REGIONAL PRIORITIES			
	R1	R6	R9
C. Design, implement, and monitor strategies to move birds.	1	1	1
II. Support Pacific Flyway Council Management Plan for RMP Trumpeter Swans.			
A. Design and implement a strategy to increase the cygnet survival rate.	1	1	1
B. Determine factors causing low cygnet survival to fledging, e.g., if breeding condition of the hen is impairing cygnet survival.	-	2	1
C. Conduct annual surveys of breeding populations, recruitment, and mid-winter populations.	-	-	1
III. Continue to provide nonconsumptive recreational and scientific opportunities that are not detrimental to the population.	-	1	1

### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP) developed by Regions covering portions of the RMP Trumpeter Swan range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 1 and 6 the Pacific Flyway Trumpeter Swan Management Plan, July 1984.

### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

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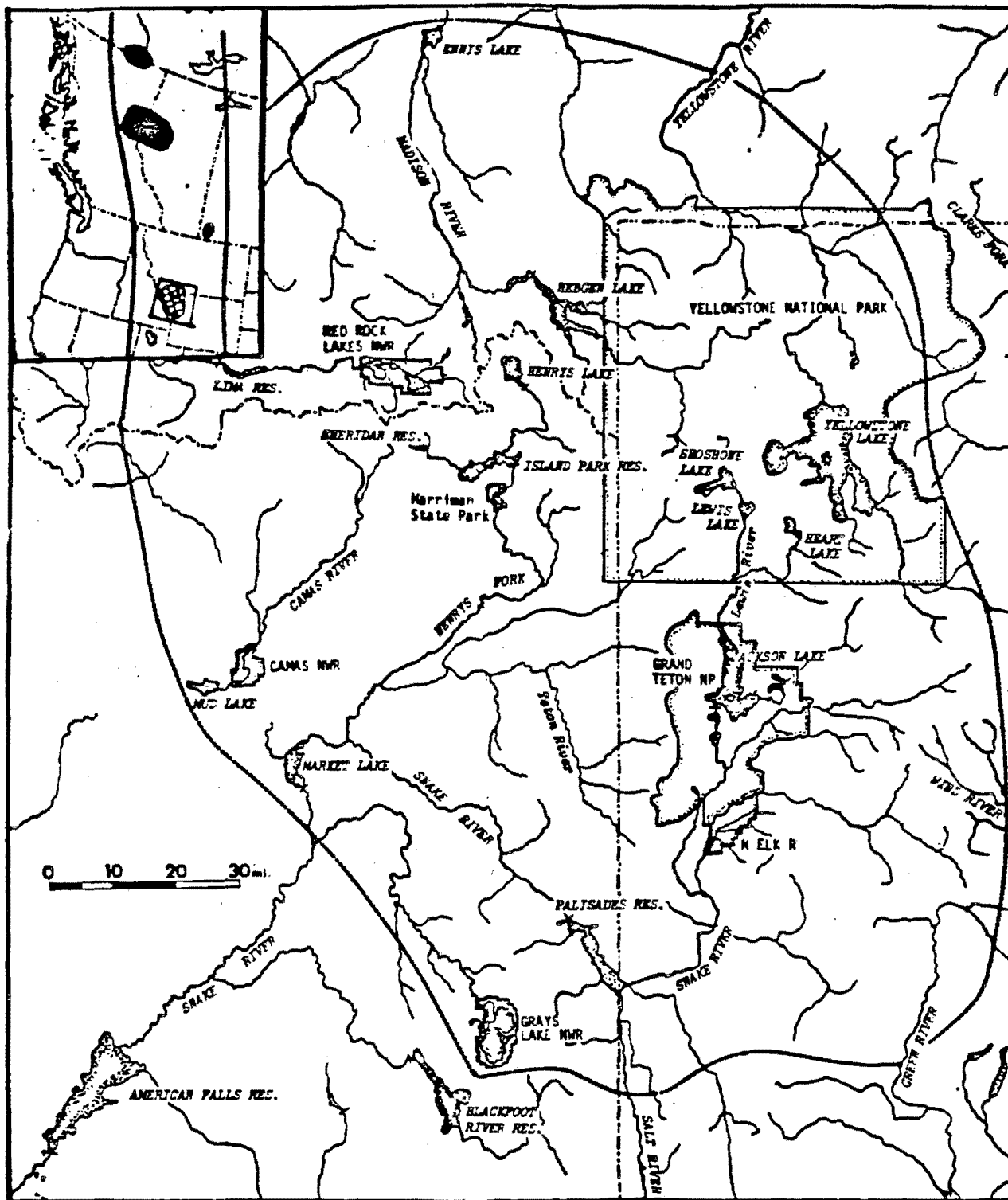


Figure 1. The inset (upper left) depicts the distribution of the Rocky Mountain Population of trumpeter swans which is comprised of the Interior Canada Subpopulation which breeds in Canada and winters in the Tristate region of Idaho, Montana, and Wyoming (large map), and the Tristate Subpopulation which breeds and winters in the Tristate region.

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE PACIFIC COAST POPULATION OF TRUMPETER SWANS

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Pacific Coast Population (PCP) of the Trumpeter Swan (Cygnus buccinator) that were developed through the Regional Resource Planning process of the U. S. Fish and Wildlife Service (FWS). It also reflects the objectives, strategies, and priorities in the draft North American Management Plan for trumpeter swans. Lead Office or Region for this plans is Region 7 with support from Region 1.

### National Objectives

The breeding, migration, and wintering distributions of these swans occurs primarily within the Pacific Flyway (See Pacific Flyway Objectives).

### Pacific Flyway Objectives

- Maintain the Pacific Coast trumpeter swan population at or above 8,000 swans as measured in late summer by the 5-year periodic Alaskan Breeding Trumpeter Swan Survey.
- Maintain the existing pattern of breeding and wintering distribution of trumpeter swans as identified in Tables 1 and 2 and depicted in Figure 1.
- Maintain nesting, migration, and wintering habitats in sufficient quantities and quality to meet objectives for population and distribution.
- Achieve natural increases in the population through natural extension of the ranges rather than transplants.
- To provide non-consumptive uses of trumpeter swans when compatible with other management objectives.

### Population Distribution and Status

Distribution - The Pacific Coast Population (PCP) of trumpeter swans breeds primarily in coastal, southcentral, and interior Alaska (Figure 1). A few nesting in the southern Yukon Territory and northern British Columbia may be a relic population, an eastern extension of the PCP or a westward expansion of the Peace River subpopulation. Several restored flocks in Washington (Turnbull NWR), Oregon (Malheur NWR), and Nevada (Ruby Valley) were transplanted from Montana (Red Rocks NWR).

Pacific Coast trumpeter swans winter in southeast Alaska, coastal and interior British Columbia, Washington, and perhaps as far south as California. There has been no detailed analysis of trumpeter swan migration routes. Although interior Alaska swans may migrate through British Columbia and the Yukon Territory, the majority apparently migrate along the coast.

Status - After trumpeter swans were found to be more widespread in Alaska than previously known, they were removed from the list of "rare species" on the FWS's "Red Book" in 1968. Aerial surveys in Alaska in 1968 revealed 2,847 trumpeters, 4,170 in 1975, and 7,696 in 1980. The 1980 survey also showed that trumpeter swans were most abundant in the Gulkana region (31%), followed by the Tanana (28%), Gulf Coast (16%), and Cook Inlet (16%) regions. The Alaska population apparently declined 2% in 1981 and 15% in 1982 compared to 1980, with the 1982 decrease probably related to a late spring. Overwintering population estimates range from 3,500 - 4,000 swans. The difference between summer and winter estimates indicate not all wintering areas are surveyed, swans do not use the same wintering areas each year, or they are mistaken for the more numerous tundra swans.

### Rationale for Objectives

The objective statements for the PCP of trumpeter swans presented in this plan are designed to maintain current habitat and increase the distribution of trumpeter swans by natural expansion.

### Problems

Loss of Nesting Habitat - Trumpeter swans are highly intolerant of human activity in the vicinity of their nesting sites. Because only 20% of their current nesting habitat is found on wildlife refuges, rapidly increasing development and recreational activities in Alaska may affect their populations. This is particularly true of the populations that nest in proximity to the major population centers of Anchorage and Fairbanks. There is evidence that development and recreational activities have altered the breeding distribution and success of trumpeter swans on the Kenai Peninsula including the Kenai National Wildlife Refuge. Recreational cabin construction on lakes in the Susitna River drainage has also reduced the use of those lakes by nesting trumpeter swans.

Widespread exploration and development of gas and oil reserves and coal development in the Cook Inlet area of Alaska is of major environmental concern. These activities have the potential for detrimental impacts on nesting trumpeter swans in this important breeding area (1,200 trumpeters in 1980) and others.

Uncontrolled Human-related Mortality - As human populations grow in Alaska there will be an increase in the presently unmeasurable and difficult to enforce, illegal killing of trumpeter swans.

Accidental mortality of trumpeter swans from powerlines and oil pollution will increase as development occurs and the human population rapidly grows in Alaska.

Mortality from lead shot ingestion has been documented and the shooting of trumpeter swans is also increasing in Washington.

Disturbance and Habitat Loss on Wintering Areas - Developmental activities and general disturbance of swans on preferred resting and feeding areas during critical winter periods is detrimental to swans.

The overall extent and specific locations used by wintering trumpeter swans is unknown. Without knowledge of these perhaps important areas, little can be done to ensure their protection for wintering trumpeter swans.

Other problems for the Pacific Coast Population of trumpeter swans in Canada include loss of important estuarine habitat, hydropower projects, human disturbances, collisions with powerlines, shooting of trumpeter swans in British Columbia, and alternate land use of swan habitat, as well as development and harassment in the Yukon Territory.

### Strategies

The following list of PCP trumpeter swan management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium and low priorities, respectively.

		<u>REGIONAL PRIORITIES</u>	
		<u>R1</u>	<u>R7</u>
<b>I. Identify and Protect Breeding Habitat</b>			
A. Identify, catalog, and make known the critical habitats of trumpeter swans for better maintenance and protection by expanding and improving surveys, research, and banding and marking programs	2		1
B. Review project impact statements and land-use permit applications to ensure recognition and protection of swan habitats on federal and state lands.	3		1
C. Protect trumpeter swan habitats on the National Wildlife Refuge System in Alaska.	-		1
D. Work with the Alaska Department of Fish and Game (ADF&G) to enter into cooperative agreements with other Federal and State land-managing agencies and native corporations to lessen impacts of development on swan habitats.	-		2
<b>II. Identify and Protect Migration and Wintering Habitat</b>			
A. Locate and identify important staging, migration, and wintering habitat of trumpeter swans through			

July 1985

**REGIONAL PRIORITIES**

**R1                      R7**

improved surveys. Designate as "critical" those habitats used by 20 or more trumpeter swans (with ADF&G) and Washington Fish and Game (WF&G).	1	1
B. Maintain the integrity of available migration and wintering habitats through environmental review of proposals for development on areas used by swans (with ADF&G and WF&G).	1	2
C. Encourage protection of Barney Lake, an important wintering area, its associated water rights and critical feeding areas through acquisition and/or seeking of voluntary conservation easements on properties adjacent to the lake by State of Washington and/or private organizations (with WF&G).	1	-
<b>III. Reduce Mortality and Increase Recruitment</b>		
A. Protect swans especially during the breeding, nesting, and brood periods from disturbance by aircraft, recreationists and development on the National Wildlife Refuge System in order to maintain and/or increase existing swan nesting populations and distribution, nesting success, and brood survival.	1	1
B. Monitor potential pesticide and lead poisoning and determine causes of mortality among wintering swans (with WF&G).	1	-
C. Protect trumpeter swans from hunting and, through increased educational and enforcement efforts, minimize the accidental shooting of trumpeter swans where they occur with tundra swans and other waterfowl during legal hunting seasons (with ADF&G, WF&G and Oregon Fish and Game).	1	1
D. Continue to enforce existing laws which prohibit the purposeful shooting of trumpeter swans.	2	2

**Implementation**

The objectives and strategies in this Plan are consistent with the FWS Regional Resources Plans (RRP) developed by Regions covering portions of the PCP trumpeter

July 1985

swan range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 1, 6 and 7 and from the draft North American Management Plan for Trumpeter Swans.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

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Table 1. Number of trumpeter swans counted in summer in Alaska (King and Conant (1981, 1982), in Yukon Territory (McKelvey, et al. 1983), and in British Columbia (McKelvey pers. communications).

State/Province Region	Year	Single Adults	Paired Birds	Flocked Adults	Cygnets	Total
<b>Alaska</b>						
Gulf Coast	1968	29	442	191	363	1,025
	1975	32	442	190	193	857
	1980	52	586	266	351	1,255
Copper Canyon	1968	5	56	53	44	158
	1975	2	56	72	49	179
	1980	4	70	33	33	140
Gulkana	1968	31	288	81	190	590
	1975	43	556	155	284	1,038
	1980	43	1,026	632	660	2,361
Kenai	1968	3	86	27	65	181
	1975	5	72	29	39	145
	1980	12	90	8	65	175
Cook Inlet	1968	19	224	50	124	417
	1975	36	340	60	181	617
	1980	37	608	186	369	1,200
Tanana (Fairbanks)	1968	21	224	94	137	476
	1975	21	518	185	388	1,112
	1980	17	752	589	777	2,135
Upper Tanana	1982	2	16	8	0	26
Kusko <del>X</del> wim (McGrath)	1975	6	94	45	35	180
	1980	0	124	27	104	259
Yukon Flats (Ft. Yukon)	1975	0	2	0	1	3
	1980	0	2	0	4	6
Haines	1975	0	2	0	0	2
	1980	0	6	3	11	20
Totals*	1968	108	1,320	496	923	2,847
	1975	151	2,102	740	1,177	4,170
	1980	169	3,324	1,766	2,437	7,696
	1982	2	16	8	0	26
<b>Yukon Territory</b>						
Areas other than Toobally Lakes**	1978,79,81	5	42	25	6	78
<b>British Columbia***</b>						
	1978-82	0	6	0	0	6

\*Coverage and therefore, totals were greatest in 1980. Upper Tanana was surveyed for the first time in 1982.

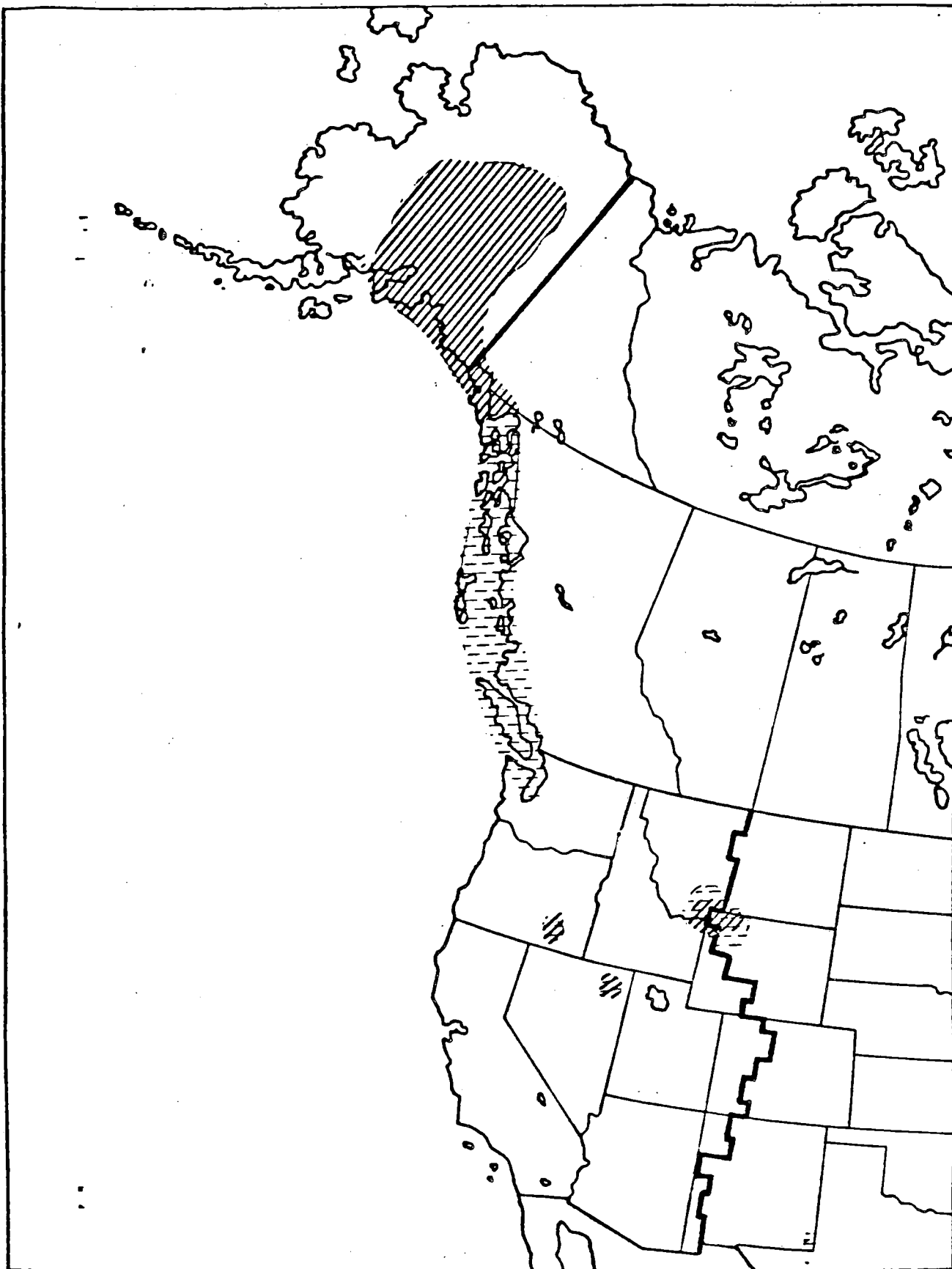
\*\*These trumpeters may belong to either the Pacific Coast or Rocky Mountain Populations. Those trumpeters in the Toobally Lakes region of Yukon Territory belong to the Rocky Mountain Population.

\*\*\*These trumpeters on the Alsek River and near Terrace and Smithers are presumed to be part of the Pacific Coast Population. Other trumpeters nesting in the Peace River drainage of British Columbia are of the Rocky Mountain Population.

Table 2. Distribution of Pacific Coast Population of trumpeter swans in winter.

State/Province Region	Estimated Number of Swans	Estimate* or Winter of Count	Source
Alaska			
Interior	A few	Estimate	Isleib 1981
South-central Coast	150-200	Estimated 10-yr. avg.	Isleib 1981
Southeastern	?		
British Columbia			
Prince George-Vanderhoof	600	Estimate	R. W. McKelvey (pers. comm.)
Lonesome Lake	350	Estimate	McKelvey 1981
	512	1970-71 count	McKelvey 1981
Queen Charlotte Islands	100	Estimate	McKelvey 1981
	117	1974-75 count	McKelvey 1981
Mainland Inlets	500	Estimate	McKelvey 1981
	575	1976-77 count	McKelvey 1981
Fraser Valley	100	Estimate	McKelvey 1981
Vancouver Island	900	Estimate	McKelvey 1981
Okanagan Valley	10	1977-78 count	McKelvey 1981
Washington			
Skagit Valley	284	1978-79 count	Jordan & Canniff (1981)
	294	1979-80 count	Jordan & Canniff (1981)
	436	1980-81 count	M. Jordan (pers. comm.)
	405	1981-82 count	M. Jordan (pers. comm.)
	395	1982-83 count	M. Jordan (pers. comm.)
Elsewhere	348	1982-83 count	M. Jordan (pers. comm.)
	100-150	1982-83 estimate of uncounted swans	M. Jordan (pers. comm.)
Turnbull NWR (restor- ation flock)	5	1982-83 count	Hagen 1983
Oregon-Washington			
Lower Columbia River	6	1980-81 count	Cady, et al. 1981
	4	1981-82 count	Cady, et al. 1981
Oregon			
Northwest Coast	10	Estimate	B. Sharp (pers. comm.)
Malheur NWR (restor- ation flock)	67	1979-80 count	Cornely, et al. 1981
Nevada			
Ruby Lake NWR (restor- ation flock)	40-50	1979-82 counts	S. H. Bouffard (pers. comm.)

\*Estimates are based upon partial surveys or a composite of observations on wintering swans in the 1970's.



 BREEDING  
 WINTERING  
 MIGRATION

Figure 1. Breeding and Wintering areas of PCP of Trumpeter Swans

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE WESTERN POPULATION OF TUNDRA SWANS

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Tundra Swan (Cygnus columbianus, western population) that were developed through the Regional Resource Planning process (RRP) of the U. S. Fish and Wildlife Service (FWS). Lead Office or Region for this plan is Region 7 with support from Region 1.

### National Objectives

The breeding, migration and wintering distributions of these tundra swans are limited to the Pacific Flyway (see Pacific Flyway Objectives).

### Pacific Flyway/Regional Objectives

- To maintain a 3-year population index for the western population of tundra swans of at least 38,000 as indicated by the Mid-winter Waterfowl Survey.
- To maintain current patterns of distribution throughout the range of the tundra swan.
- To maintain breeding, migration, and wintering habitats of tundra swans in sufficient quantity and quality to meet objectives for size and distribution of populations of tundra swans.
- To provide for maximum aesthetic, educational, scientific, and hunting uses of tundra swans.

### Population Distribution and Status

Distribution - The tundra swan, formerly called the whistling swan, breeds and summers in Alaska on coastal tundra fronting on the Bering, Chukchi, and Beaufort seas and is divided into the Western (WP) and the Eastern (EP) populations of tundra swans. The WP winter in the Pacific Flyway and the EP winter in the Atlantic Flyway (Figure 1).

Swans nesting in Bristol Bay lowlands and in the Yukon-Kuskokwim Delta constitute 16 percent and 74 percent respectively, of the tundra swans in Alaska that winter mainly in the Pacific Flyway. Swans from the Seward Peninsula and Kotzebue Sound region, which collectively represent about 6 percent of the population, go to both Pacific and Atlantic Flyways; the proportions are poorly defined.

Both interior and coastal migration corridors are followed by WP swans migrating between Alaskan breeding grounds and wintering grounds in the Pacific Flyway. Perhaps three-fourths of these swans use interior routes for most of the migration, and the remainder migrate along the coast.

The western population of swans winter in all 12 Pacific Flyway states and in the Province of British Columbia. They are rarely reported in Mexico. Average distribution of wintering swans within the 11 Pacific Flyway states (neither Alaska nor British Columbia are surveyed on a regular basis) during the period 1973 to 1982 is listed below.

California	74%
Oregon	11%
Utah	8%
Washington	3%
Nevada	3%
Idaho	trace
W. Montana	trace
W. Wyoming	trace
Arizona	trace
W. New Mexico	trace
W. Colorado	trace

Status - Swans have been counted by the FWS throughout much of their range in Alaska since 1958 during the breeding waterfowl survey. The average number of swans including EP swans in surveyed areas of Alaska from 1973 to 1982 was 74,000. The estimated number of swans in unsurveyed areas of the state during the period was 4,000 to 5,000.

During the 10-year period between 1973 and 1982, tundra swans averaged about 59,000 birds based on the mid-winter waterfowl survey conducted by FWS. The calculated regression slope of winter counts indicates an annual increase of about 1,400 birds from 1948 to 1982 and an annual increase of about 4,000 birds during the period 1973 to 1982.

Perhaps the most unusual and possibly unique group of WP of tundra swans is the flock of about 600 that breeds at the southern end of the Alaska Peninsula and winters on Unimak Island and near Izembek Lagoon, Alaska.

#### Rationale for Objectives

The objective statements for the WP of tundra swans presented in this plan are designed to maintain the current population size and distribution of this species.

#### Problems

Lack of Data - A serious management problem is the lack of basic information on the distribution, migration pathways, population status, structure, productivity, mortality, and habitat requirements for populations of tundra swans in Alaska. Effective management of tundra swans will require quantitative data on these issues. Valuable habitat may be lost or birds dispersed from breeding or staging areas because of our inability to identify and protect these areas.

Habitat Loss and Disturbance - Offshore and onshore petroleum development and mineral development, reindeer husbandry, and an increasing human population in western and northern Alaska have the greatest potential for altering habitats of breeding tundra swans and limiting their productivity. Petroleum exploration and development is in progress throughout the range of the tundra swan in Alaska. Those sales that may impact

the WP of tundra swans include Norton (1982, 1985), St. George (1983, 1984, 1986) and North Aleutian Shelf Basins (1985). Onshore exploration is in progress in the upper Cook Inlet/Susitna drainage which is used principally by WP swans. It is expected that increased emphasis will be placed on other onshore petroleum resources within the next decade as Federal lands are conveyed to native corporations and the State of Alaska.

Additional threats to habitat of tundra swans include the development of mineral resources and reindeer husbandry. Increasing development of all types, combined with an increasing human population, may reduce the quality and quantity of habitat to a point where the population objectives will not be possible.

Spring and Summer Subsistence Harvest - The unmeasured subsistence harvest of swans occurring from spring through fall in Alaska (perhaps 3,000 swans) and the illegal take from fall through spring in the "lower states" (perhaps 200 swans) does not allow managers either to equitably or optimally allocate harvest among the many hunting and nonhunting users throughout the Pacific Flyway.

Subsistence harvest of tundra swans is known to occur throughout their range in Alaska, but is probably of greatest concern in the Yukon-Kuskokwim Delta as well as Bristol Bay, Seward Peninsula and the Arctic Coastal Plain. The magnitude and the significance of take to the status of these two populations are unknown. Lack of quantitative subsistence harvest data is expected to be of continuing concern. Reduced populations as a result of natural phenomena and illegal harvest of tundra swans during years of poor production may be significant limiting factors.

### Strategies

The following list of WP tundra swan management strategies is indexed by priority for FWS regions. The priority scale of 1, 2 and 3 represents high, medium and low priorities.

<u>REGIONAL PRIORITIES</u>		
	<u>R7</u>	<u>R1</u>
I. Protect and Improve Breeding Habitat		
A. Define use areas by particular flocks and protect key habitat through acquisition, easement or cooperative agreement.	1	-
B. Minimize disturbances from people, boats, snowmachines and aircraft during critical periods (ie. nest site selection, laying, incubation, and brood rearing).	1	-
C. Prohibit reindeer grazing in key production areas.	2	-
D. Continue annual population and productivity surveys in key breeding habitats.	1	-

REGIONAL PRIORITIES  
R7                      R1

II. - Identify and Protect Wintering Habitat

- |   |   |   |
|---|---|---|
| A. Define use areas by particular flocks and protect key habitats through acquisition, easement or cooperative agreement. | - | 1 |
| B. Minimize disturbances from people, vehicles and aircraft.  | - | 1 |

III. Reduce Mortality and Increase Recruitment

- |   |   |   |
|---|---|---|
| A. Initiate or continue efforts to reduce losses due to collisions with transmission/utility lines and with aircraft. | 3 | 3 |
| B. Monitor and minimize or prevent occurrence of mortality due to avian diseases.                                     | 2 | 2 |
| C. Monitor annual permit hunting programs in participating states.  | - | 1 |
| D. Determine extent and characteristics of the subsistence harvest.   | 1 | - |

Implementation

The objectives and strategies presented in this plan are consistent with FWS Regional Resource Plans (RRP) developed by Regions covering portions of the WP of the tundra swan range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Regional Resource Plans for Regions 1, 6 and 7 and the Tundra Swan (Western Population) Flyway Management Plan (Draft 1982).

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

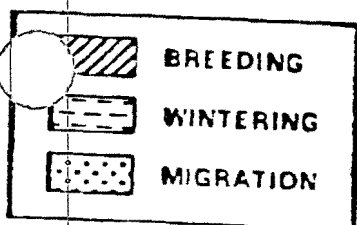
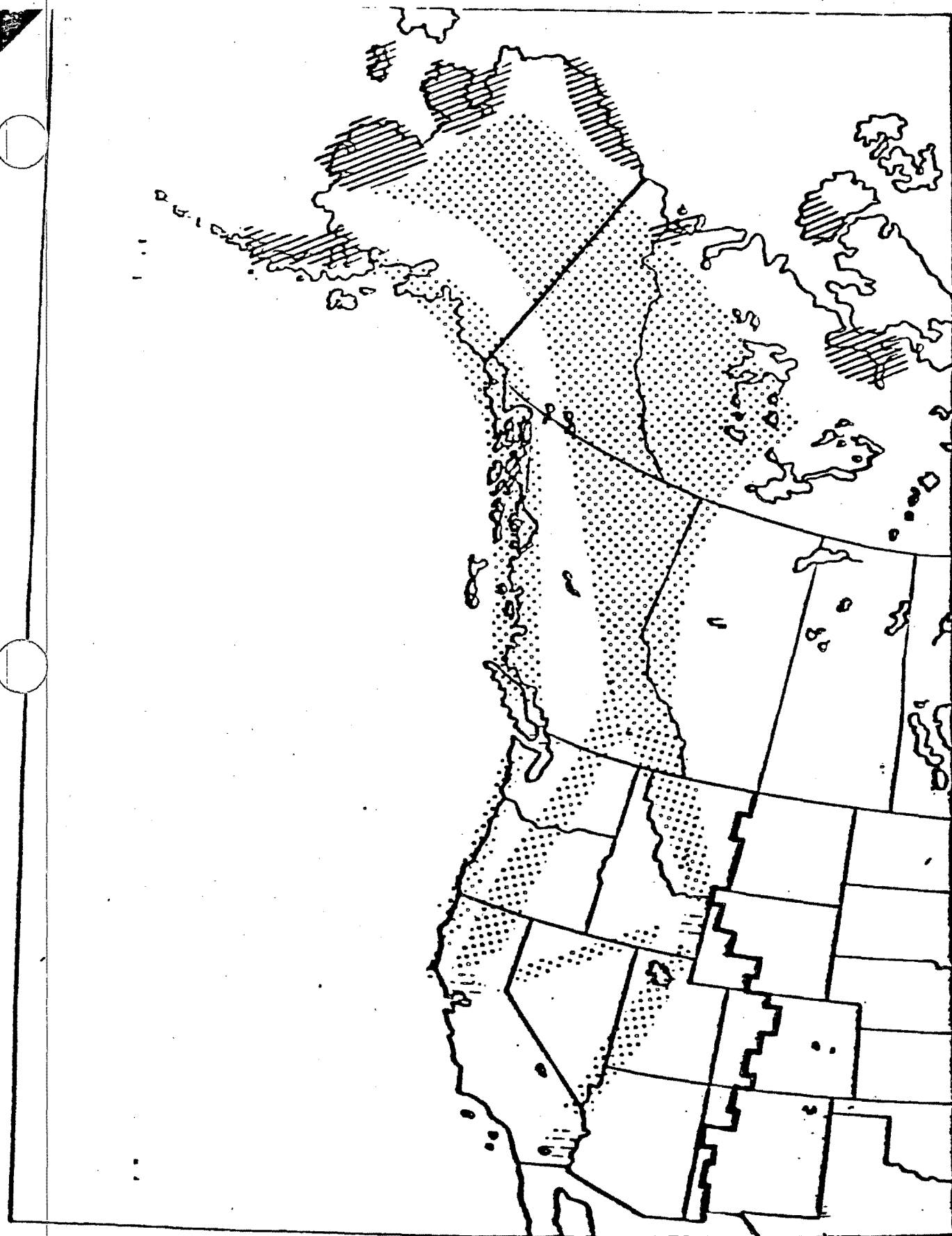


Figure 1. Breeding, Wintering and Migration Areas of WP of Tundra Swans

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE EASTERN POPULATION OF TUNDRA SWANS

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Eastern Population (EP) of Tundra Swans (Cygnus columbianus columbianus) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. The lead Region or Office of this plan was the Office of Migratory Bird Management with support from Regions 3, 4, 5, 6 and 7.

### National Objectives

Achieve a stable population of EP tundra swans within the range of 60,000 to 80,000 as measured by a 3-year running average of swans counted on the annual mid-winter waterfowl survey.

Protect breeding habitat by discouraging conflicting uses of key breeding range along the Arctic Coast and major river valleys.

Improve and expand survey, research and banding programs for tundra swans in breeding, migration, and wintering habitats.

### Flyway Objectives

- Maintain a distribution of EP swans during migration and wintering similar to that observed during the last 5 years (Table 1).
- Institute experimental harvest regulations among flyways to permit recreational hunting of EP swans consistent with national population objectives, available habitat and public demand. Harvest objectives will be determined among flyways as detailed in the Tundra Swan Management Plan.

### Regional Objectives

- Regions 3 and 6 should minimize natural mortality and provide and maintain migratory habitat consistent with national population objectives.
- Region 4 should stabilize swan numbers in North Carolina within the range of 35 to 40 thousand.
- Regions 4 and 5 should control depredations to agricultural crops and commercial shellfish caused by EP tundra swans and hold depredations below acceptable levels.
- Region 7 should maintain breeding and migration habitat in sufficient quantity and quality to meet objectives for size and distribution of specific populations.

### Population Distribution and Status

**Distribution** - The EP of tundra swans breeds in Alaska as far west as the Seward Peninsula, then eastward across Arctic Canada to the northeast shore of Hudson Bay and Baffin Island. A majority of these swans transit western Canada, North Dakota and the upper Mississippi Flyway States enroute to the mid-Atlantic States where virtually all of them winter (Figure 1). The return flight in the spring follows the same route but is much slower than the rapid fall passage.

**Status** - A comparison of mid-winter survey figures for EP Tundra swans (Table 1) shows a gradual increase in the size of the population over the last 15 years. Numerically, the increase has been greatest in North Carolina and Virginia. There is indication of a decline in swans in Maryland in most recent years. Although variable due to spring weather, there is also some evidence that the productivity of swans has increased in recent years (Table 2). There are no historic harvest records for this species because it has not been legal game in the eastern United States since the advent of the Migratory Bird Treaty with Canada.

### Rationale for Objectives

The objective statements for EP tundra swan presented in this plan are designed to stabilize the wintering population within a range of 60,000 to 80,000. Increased depredation problems with agriculture and commercial fishing in recent years suggests that continued population growth is not desirable. Sport hunting is viewed as a consistent means of regulating population size. Tundra swans are aesthetically important for viewing and photographing. Currently, populations are large enough to meet these demands.

### Problems

**Depredations** - With the increase in the number of EP swans, there has been a corresponding increase in conflicts with agriculture. A major portion of the wintering swan population has adopted field feeding as a normal activity. Estimates of damage to wheat in North Carolina in 1980 and 1981 exceeded 1 million dollars. Damage to seeded oyster beds in Virginia and cranberry crops in New Jersey has also been reported.

**Disease and Other Losses** - Lead poisoning and oil spills occasionally cause highly visible mortalities in EP swans. There is an illegal harvest of unknown size occurring on breeding, migration and wintering areas.

**Habitat** - The breeding range of EP swans is large, but the breeding habitats selected (i.e. river deltas) are specific and are vulnerable to degradation. Offshore and onshore petroleum and mineral development and an increasing human population in western and northern Alaska have the greatest potential for altering habitats of breeding tundra swans and limiting their productivity. Onshore petroleum production is in progress in key breeding areas of the EP tundra swans including Prudhoe Bay/Kuparuk and the National Petroleum Reserve-Alaska.

The same holds true regarding the vulnerability of migration and wintering habitats traditionally utilized by EP swans. Major threats to the quality of these areas exist from agricultural land use practices which alter the abundance of submerged aquatic food plants. The loss and degradation of wintering wetland habitat over time is believed to have encouraged field feeding by swans.

### Strategies

The following list of EP tundra swan population management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium and low priorities, respectively.

	<u>REGIONAL PRIORITIES</u>				
	<u>R3</u>	<u>R4</u>	<u>R5</u>	<u>R6</u>	<u>R7</u>
I. Initiate management plans to reduce crop depredation to acceptable levels.	3	1	1	3	-
II. Implement harvest management plans to stabilize the population at 60-80 thousand based on the winter survey.	3	1	1	3	3
III. Maintain the winter distribution of EP Swans based on the 1979-83 period records.	3	2	2	3	-
IV. Improve aquatic food plants in wetland habitats to increase utilization by EP Swans.	-	2	3	-	-
V. Protect and preserve aquatic habitats on key migration areas.	1	-	3	1	2
VI. Control disturbance, resolve conflicting utilization and protect important breeding habitat.	-	-	-	-	1
VII. Improve surveys and population estimates on breeding areas.	-	-	-	-	1

### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP) developed by Regions covering portions of the EP Tundra Swan range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 3, 4, 5, 6 and 7 and the Management Plan for the Eastern Population of Whistling Swans, August 1982.

July 1985

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Distribution of Tundra Swans in the Mid-Atlantic Region Based on Winter Survey Estimates (1969-83).

Year	Estimates in thousands				Total (all States)	Percent Wintering in:		
	MD	VA	NC	Others		MD	VA	NC
1969	36.4	Tr.	25.6	Tr.	62.0	59	0	41
1970	34.1	5.8	15.0	0.1	55.0	62	10	27
1971	38.8	3.4	16.0	Tr.	58.2	67	6	27
1972	39.7	3.1	17.0	2.2	62.8	63	5	27
1973	34.4	3.0	19.0	0.6	57.0	60	5	33
1974	32.4	4.8	25.0	1.8	64.0	51	8	39
1975	36.4	2.0	26.9	1.3	66.6	55	3	40
1976	28.5	7.1	41.7	1.3	78.6	36	9	53
1977	2.76	4.5	43.3	0.8	76.2	36	6	57
1978	35.0	6.9	23.8	4.5	70.2	50	10	34
1979	34.5	9.7	30.5	4.0	78.6	44	12	39
1980	30.0	11.3	19.7	2.5	63.5	47	18	31
1981	30.0	13.1	46.6	3.1	92.8	32	14	50
1982	19.6	9.8	42.2	1.3	72.9	27	13	58
1983	23.0	5.6	52.2	5.7	86.5	27	7	60
1984	29.0	7.1	44.1	0.9	81.1	36	9	54
1985	23.5	6.9	61.5	2.0	93.9	25	7	65

Table 2. Tundra Swan Productivity Data - Atlantic Flyway (1961-1980).

Year	% Immatures	Young/Family	Sample Size
1961	15.0	—	2,262
1962	15.9	—	3,293
1963	14.7	—	2,092
1964*	12.1	2.09	8,762
1965	12.1	2.10	15,286
1966	11.2	2.24	20,640
1967	9.0	1.80	9,307
1968	10.1	1.81	16,945
1969	4.8	1.54	5,461
1970	14.9	1.87	4,603
1971	14.6	2.02	8,664
1972	4.4	1.69	—
1973	14.6	2.03	—
1974	17.4	1.79	1,954
1975	18.5	1.71	569
1976	9.0	1.16	7,912
1977	19.7	2.19	3,684
1978	7.7	1.22 (VA only, N=337)	2,384
1979	8.7	1.60	1,433
1980	10.5	1.80	2,060
1981	30.2	2.30	1,479
1982	11.4	1.90	5,576
1983	19.8	2.00	7,537
1984	19.8	—	—

\* First year that family group data was recorded.

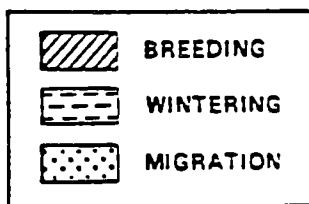
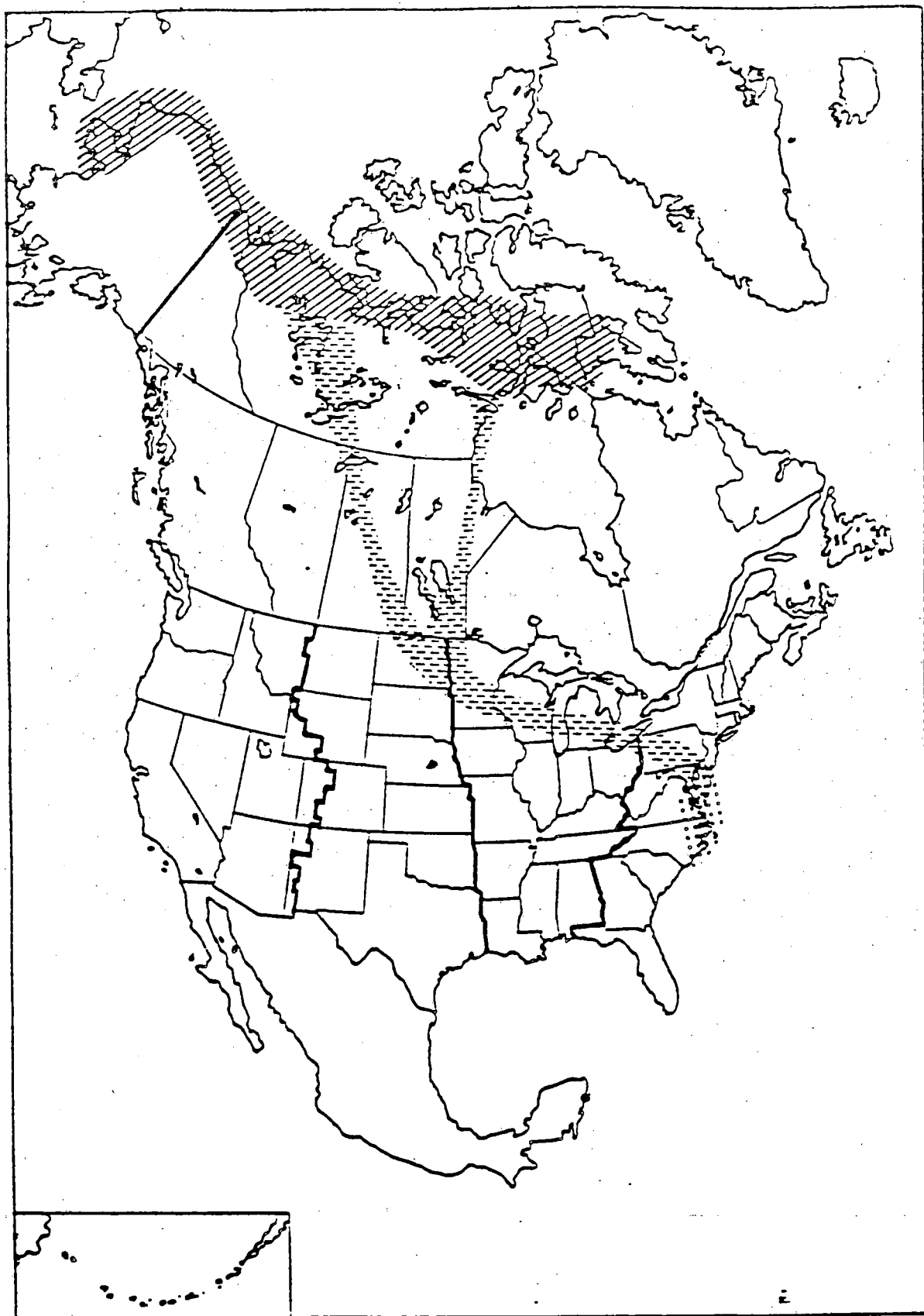


Figure 1. Breeding, Migration and Winter Distribution of Eastern Population of Tundra Swans.

July 1985

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE PACIFIC FLYWAY POPULATION OF LESSER CANADA GEESE

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Pacific Flyway Population of Lesser Canada Geese (Branta canadensis taverneri and B. c. parvipes) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service and based, in part, on a management plan being cooperatively developed with the Canadian Wildlife Service and the States and provinces of the Pacific Flyway. Lead Region for this plan is Region 1 with support from Region 7.

### National Objectives

- . This population is restricted primarily to the Pacific Flyway (see objectives below).

### Pacific Flyway Objectives

1. Maintain a population of from 100,000 to 150,000 geese in the the eastern portions of Washington and Oregon as measured by a 3-year average of midwinter inventories, combined with bi-annual field assessments to determine subspecies composition of the total Canadian goose population.
2. Maintain in western Oregon and western Washington at least 20,000 Lesser Canada Geese, but consistent with the population objective for Dusky Canada Geese, (i.e., not less than 20,000 Dusky Canada Geese as part of a maximum objective of 75,000 Canada geese for the area as measured by mid-winter count).
3. The distribution of geese east of the Cascade Range in Washington and Oregon should be maintained at approximate distribution depicted in Figure 1 but allow it to expand into new areas.
4. Maintain habitats in sufficient quantity and quality to meet objectives for population size and distribution.
5. Seek optimum harvest of geese consistent with population and distribution objectives, recognizing both sport and subsistence hunting. Optimum harvests in eastern Oregon and Washington are from 33,000 to 50,000 geese, annually; in western Oregon and Washington up to 18,000 geese; but unspecified for California, Alaska, British Columbia, and Yukon Territory.
6. Provide for maximum nonconsumptive uses that are consistent with programs on local areas and with other management objectives of this plan.

### FWS Regional Objectives

The U.S. range of the Lesser Canada Goose falls within Regions 1 and 7, therefore FWS Regional objectives are the same as Pacific Flyway objectives.

### Population Distribution and Status

**Distribution** - Two subspecies of small Canada geese are collectively called Lesser Canada Geese. The distinction between breeding ranges of the two subspecies is believed to be tundra areas of Alaska and northwestern Canada for taverneri and interior forested areas for parvipes, with an unknown degree of intergradation. Lesser Canada Geese nest virtually throughout Alaska and Yukon Territory, except for mountainous regions above 2,000 feet elevation. Most nesting birds use stream courses and valleys, while molting geese prefer large lake systems. Tundra-nesting Lesser Canada Geese usually nest several miles from the coast in the same habitats as White-fronted Geese. There are apparently two major fall migration routes—coastal and interior. Lesser Canada Geese winter principally in Washington, Oregon, California and British Columbia (Figure 1).

**Status** - Annual population estimates of Lesser Canada Geese in California, based on mid-winter inventories, have been approximately 10,000 birds. However, accurate census data are not available because Lesser Canadas Geese constitute a relatively insignificant proportion of the Canada Geese in that state, subspecies identification is difficult, and the wintering habitat is widespread. Lesser Canada Geese wintering in eastern Washington and Oregon average about 100,000 to 125,000 birds and mingle with flocks of the large Western Canada Geese. Lesser Canada Geese wintering in western Oregon and Washington numbered about 50,000 birds of the 73,500 Canada Geese wintering there in 1981-82. The flock of Lesser Canada Geese wintering in British Columbia is small, probably less than a thousand birds.

### Rationale For Objectives

The objective statements for Lesser Canada Geese presented in this plan are designed to maintain a population to provide adequate sport and subsistence harvest, while minimizing crop depredation, and interspecific competition with the Dusky Canada Goose.

### Problems

**Lack of Information On Breeding Grounds and Migration Areas** - Perhaps the most significant problem of Lesser Canada Geese management is the FWS's inability to make informed decisions due to the lack of basic information on the size, status, and distributions of the subspecies or their subpopulations, their summer ecology, or their habitat requirements. This lack of fundamental information makes it difficult to determine the full effect of existing management programs.

Migration routes and migration use areas are not well defined and habitat requirements are virtually unknown for geese using most spring and fall staging areas. This severely limits options for protecting habitat, mitigating habitat losses and regulating harvest. The disturbance from aircraft and other causes is increasing on migration areas and is adversely affecting geese to an unknown degree.

Potential Threats To Breeding Grounds - Industrialization, mining, timber harvest, and oil and gas development are all occurring within the breeding range of Lesser Canada Geese in Alaska. Major molting and staging areas such as the Teshekpuk Lake area and estuaries along the north side of the Alaska Peninsula are or will be subject to impacts from oil and gas exploration and development. Hydropower development could also pose important threats to wetland habitats used by Lesser Canada Geese. As is the case with most other arctic and subarctic nesting geese, relatively little is known about Native subsistence use of these subspecies.

The problem of inadequate information on Lesser Canada Geese is primarily in Alaska, as are the potential threats to this population. Key staging areas where Lesser Canada Geese may be most vulnerable include the Teshekpuk Lake areas, and coastal marshes of Izembek Lagoon, Nelson Lagoon/Port Moller, Port Heiden, Nunivak Island, Chagvan Bay, West Cook Inlet, Prince William Sound, Copper River Delta and Stikine River Delta. Breeding habitats that are within major existing or planned development areas include the Arctic Coastal Plain, the Yukon River drainage, Seward Peninsula, Bristol Bay, and Cook Inlet. Subsistence harvest is known to occur in the Yukon-Kuskokwim Delta, Bristol Bay, and in interior Alaska. Subsistence harvest may also occur in other areas of the state where these subspecies breed or stage.

Offshore and onshore petroleum exploration is occurring in breeding, molting, and staging areas of Lesser Canadas. Petroleum industry expansion is almost certain over the next decade. The OCS sales are scheduled for the St. George Basin, North Aleutian Basin, Norton Basin, Beaufort Sea, and Cook Inlet. Onshore exploration in Lesser Canada Goose habitats is in progress in the National Petroleum Reserve-Alaska and the Prudhoe Bay, West Cook Inlet, and Alaska Peninsula areas. State leases to explore for coal have recently been sold and other leases are scheduled in the immediate future. Although present demand for power is generally being met by existing facilities, many State, Federal, and private hydropower projects in Alaska are under consideration.

Population, Physiological and Socioeconomic Information Gaps - The identification and estimation of numbers of geese by subspecies is difficult. This limits the options of managing agencies to monitor changes in subspecies composition and numbers of geese in some areas, and precludes more precise management of individual subspecies. The carrying capacity of wintering areas is undetermined. Unknown biological aspects (energetic requirements of geese and nutrient availability in forage), as well as political, sociological and economic ramifications of wintering Canada geese preclude efficient problem solving in concentration areas.

Increased Concentrations - Building concentrations of Lesser Canada Geese confined to a few areas pose threats of increased depredation, increased potential for disease, and may limit utilization of the resource to relatively few people. Further limitations on resource use are imposed due to closures of private lands. This situation occurs primarily in goose concentration areas. The use of pesticides may pose a serious threat in some prime wintering areas (e.g., heptachlor problem in Umatilla area).

### Strategies

The following list of Lesser Canada Geese management strategies is indexed by priority for FWS regions. The priority scale of 1, 2 and 3 represents high, medium and low priorities, respectively.

July 1985

REGIONAL PRIORITIES  
R1 R7 R8 R9

I. Identify, maintain and enhance habitat throughout the range of the Lesser Canada Geese.				
A. Participate in planning, permitting, and operational monitoring phases of economic resource development activities potentially affecting essential habitats of Lesser Canada Geese	1	1	-	1
B. Maintain present state and federal areas closed to waterfowl hunting and other public uses as necessary for goose resting and sanctuary purposes.	2	1	-	1
C. Classify important waterfowl habitat in Redoubt Bay, Alaska as State refuge.	-	2	-	2
D. Develop additional Federal and State owned or managed areas in western Oregon to attract and hold geese. These general areas include Fern Ridge Reservoir and the Lower Columbia River below the Longview Bridge.	2	-	-	2
E. Encourage land exchanges, easements or cooperative management agreements with native corporations and other land owners to enhance the protection of essential habitats for Lesser Canada Geese in Alaska.	-	2	-	2
F. Create goose pastures on state and federal lands to increase forage and hold birds in certain areas of eastern Washington/Oregon to maintain the recommended distribution of geese.	3	-	-	3
G. Investigate the possibility of incentive payments, and/or cooperative agreements to create additional goose grazing in eastern Washington/Oregon.	3	-	-	3

July 1985

REGIONAL PRIORITIES  
R1 R7 R8 R9

II. Increase data base through population monitoring and improved survey technology.

A. Expand and improve waterfowl survey, research and banding programs for Lesser Canada Geese in Alaska, particularly the Yukon-Kuskokwim Delta, Innoko River Valley, Kotzebue Basin, Yukon Flats, and Cook Inlet areas.

1 1 1 1

B. Develop and/or refine a system for subspecies identification in the field, using aerial photography or visual criteria.

1 - 1 1

C. Implement techniques to separate Lesser Canada Geese from other subspecies by using tail feathers or breast feathers obtained from parts collection surveys or morphological measurements on birds at the check stations and field bag checks wherever feasible.

1 2 1 1

D. Monitor season length, bag limit, shooting days and hours on an annual basis, and change if warranted to effect desired harvest.

1 2 - 1

E. Continue monthly census counts in wintering areas to meet local objectives. Subspecies composition will be adjusted by aerial photography (if technique is developed) or by ground surveys.

1 - - 1

F. Conduct annual mid-winter inventories of all Canada Geese, coordinated with field assessments for subspecies composition.

1 - - 1

G. Initiate studies to determine the physical, economic, and political effects of crop depredation, particularly in those areas with consistent complaints and large concentrations of geese.

2 - 2 2

III. Provide opportunity for sport and subsistence harvest.

A. Provide for regulated spring and summer harvest by amending the Migratory Bird Treaty with Canada.

- 1 - 1

July 1985

REGIONAL PRIORITIES

R1   R7   R8   R9

B. Promote opening of private lands in eastern  
Washington and Oregon to hunting.

2   -   -   2

Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP) developed by Regions covering portions of Lesser Canada Geese range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Service's Resource Plans for Regions 1 and 7 and the Lesser Canada Geese Management Plan for the Pacific Flyway, Draft, 1980.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.



-  BREEDING
-  WINTERING
-  MIGRATION

Figure 1. Breeding Migration and Winter Distribution of the Lesser Canada Goose (Pacific Flyway).

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE DUSKY CANADA GOOSE

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Dusky Canada Goose (Branta canadensis occidentalis) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service and were derived from a management plan that was cooperatively developed with the States of the Pacific Flyway. Lead Region for this plan is Region 1 with support from Region 7.

### National Objectives

The breeding, migration, and wintering distributions of the Dusky Canada Goose are limited to the Pacific Flyway (see objectives below).

### Pacific Flyway Objectives

1. Maintain a wintering population of 20,000 Dusky Canada Geese (three-year-running average) as measured during the Midwinter Waterfowl Survey.
2. Maintain the present traditional production, migration, and wintering habitats in sufficient quantity and quality to meet the population objectives.
3. Seek to distribute the population more widely throughout the major wintering range in western Oregon and Washington, particularly in the Willamette Valley and along the lower Columbia River.
4. Manage the Dusky Canada Goose population on a sustained yield basis recognizing both consumptive and nonconsumptive uses.

### Regional Objectives

The U.S. range of the Dusky Canada Goose falls completely within Regions 1 and 7, therefore the flyway objectives serve as Fish and Wildlife Service regional objectives.

### Population Distribution and Status

Distribution - Dusky Canada Geese nest only on the Copper River Delta of south-central Alaska and winter from coastal British Columbia to California but primarily in the Willamette Valley of western Oregon and on the flood plain of the lower Columbia River in western Oregon and Washington (Figure 1).

Status - From 1951 to 1962 the postseason population of Dusky Canada Geese varied between 10,000 and 17,000, based on winter inventories. In the mid-1960's, the Willamette Valley National Wildlife Refuges were established to provide quality

wintering habitat for Dusky Canada Geese. From 1963 to 1969 the goose population varied between 14,000 and 23,000 geese. Since 1970 the postseason population has varied between 10,100 and 26,500 geese and averaged 19,711 (Table 1 and Figure 2). The population is declining. The postseason populations for 1984 were the lowest ever recorded and production has been low in spite of favorable weather conditions during the nesting period. The three-year running average for the postseason population for 1982 to 1984 was 14,950.

Despite the apparent decline in the numbers of Dusky Canada Geese, midwinter populations of other Canada geese in western Oregon and Washington have dramatically increased because of the influx of Taverner's Canada Geese. During the January 1983 midwinter count an estimated 73% of the 62,000 Canada Geese were Taverner's compared to 27% Dusky Canada Geese.

#### Rationale for Objectives

The objective statements for the Dusky Canada Geese presented in this plan are designed to return the population levels to numbers recorded in the 1970s. This objective level will allow a sport harvest while also providing opportunity for nonconsumptive uses.

#### Problems

**Nesting Habitat** - The Good Friday earthquake of 1964 uplifted the entire nesting area of the Dusky Canada Goose in south central Alaska initiating vegetative successional changes. These changes have resulted in an increase in woody vegetation especially along the sloughs and ditches of the area. This gradual encroachment of shrubs and trees may be reducing the amount of habitat suitable for nesting geese. In addition, the increased cover has been accompanied by an increase in the activities of nest predators on the Dusky Canada Goose nesting grounds. Based on past research, the conditions during the nesting seasons in 1982 and 1983 should have been quite favorable for goose production, but, due to nest destruction and poor recruitment, production was poor. Mortality has exceeded production for the past four years (1981-1984).

**Heavy Harvest** - The Dusky Canada Goose population is subject to a heavy sport harvest, but it is not important to subsistence hunters. Estimated annual harvest rates average above 25 percent (Figure 2). Based on band reports during 1973-1980, 68 percent of the sport harvest occurs in Oregon. Alaska, British Columbia, and Washington harvest 14 percent, 9 percent and 9 percent, respectively. Up through the mid-1970s Dusky Canada Geese comprised about 80 percent of the goose harvest in western Oregon. As the population of Taverner's Canada Geese increased in that region, the proportion of Dusky Canada Geese decreased. By 1982 Dusky Canada Geese constituted only 56 percent of the harvest, but the numbers harvested have remained consistently high with only slight indications that the larger numbers of Taverner's Canada Geese have buffered them. A combination of traditional hunting practices and behavioral differences between the two races of geese have resulted in a higher proportion of Dusky Canada Geese in the harvest than expected based on their numbers.

**Winter Habitat** - Another potential problem is competition for feeding and resting habitat between the Dusky Canada Geese and the Taverner's Canada Geese. This aspect of their wintering ecology has not been examined in any detail.

Breeding Habitat - Human disturbance on the Copper River Delta during the period of goose use (mid April-October) could adversely affect the population by low-level aircraft activity, more viewers and general recreation, and more research projects. A significant increase in disturbance could result from a proposed road which would link Cordova with the highway system and from development of the Bering River coal field. Oil exploration and permanent site drilling on uplands and near shore areas of the Copper River Delta could result in adverse impacts to habitat and the goose population. Oil spills may occur from off-shore oil drilling and oil tanker traffic, resulting in chronic or catastrophic damage to the Copper River Delta habitat and its wildlife resources.

### Strategies

The following list of Dusky Canada Goose population management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium and low priorities, respectively.

#### REGIONAL PRIORITIES

R1   R7   R8   R9

#### I.    Protect and Enhance Breeding Grounds.

A. Encourage the State of Alaska to investigate the influence of predation on nesting success and recruitment rate of Dusky Canada Geese and implement a predator reduction program if appropriate.	2	1	-	1
B. Maximize breeding habitat quality on the Copper River Delta.	-	2	-	-
C. Establish cooperative agreements with private landowners adjacent to the Copper River Delta that are designed to protect Dusky Canada Goose populations and habitats.	-	3	-	-
D. Participate in the planning, permitting, and operational monitoring phases of development activities potentially impacting Dusky Canada Goose populations and habitats.	-	2	-	3

#### II.    Protect and Enhance Wintering Areas.

A. Develop and maintain quality wintering habitat on NWRs.	1	-	-	-
B. Encourage the development and maintenance of quality wintering habitat by other federal agencies, States, or private organizations.	2	-	-	3

July 1985

REGIONAL PRIORITIES				
	<u>R1</u>	<u>R7</u>	<u>R8</u>	<u>R9</u>
C. Investigate the impact of increasing populations of Canada geese on wintering populations of Dusky Canada Geese.	1	-	1	-
III. Collect Data on Population Dynamics to be Used in Species Management.				
A. Monitor annual production of Dusky Canada Geese on the Copper River Delta during July and August.	-	1	-	-
B. Develop techniques for estimating the size of the Dusky Canada Goose breeding population on the Copper River Delta.	1	1	1	-
C. Monitor the extent and characteristics of the recreational harvest of Dusky Canada Geese. If the wintering population falls below 20,000 reduce the harvest in both the breeding and wintering areas to balance mortality and production and stabilize the population.	1	-	-	-
D. Inventory the Dusky Canada Goose population during the winter to measure the attainment of the population objective.	1	-	-	-
E. Investigate harvest strategies that would effect differential harvests among the several subspecies of Canada Geese using the wintering areas.	1	-	-	2

#### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP) developed by Regions covering portions of the Dusky Canada Goose range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

#### Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 1 and 7 and the Dusky Canada Goose Management Plan for the Pacific Flyway (1984 draft).

July 1985

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1.  
Summary of population data for dusky Canada geese, 1971-83.

Year	Mid-winter	Breeding Populations <sup>b</sup>	% Yg.	% non-prod. ad. <sup>c</sup>	No. Yg. Produced	Fall Flight	Harvest <sup>d</sup>
1971	20,850	20,065	16.2	79.7	3,880	23,945	5,995
1972	17,950	17,275	10.6	71.7	2,050	19,325	3,450
1973	15,875 <sup>a</sup>	15,280	36.0	64.6	8,595	23,875	4,875
1974	19,000	15,290	51.4	35.7	19,345	37,635	12,070
1975	26,550 <sup>a</sup>	25,565	17.9	84.5	5,575	31,140	9,010
1976	22,725	21,870	24.2	54.2	6,890	28,850	6,350
1977	22,500	21,650	44.3	56.9	17,225	38,875	15,100
1978	23,775	23,000	24.8	71.8	7,600	30,600	5,100
1979	25,500	24,500	16.0	87.0	3,700	28,200	6,200
1980	22,000	21,300	23.7	67.4	6,600	27,900	4,900
1981	23,000	22,200	17.9	92.0	4,800	27,000	9,250
1982	17,740	17,000	23.7	79.1	4,000	21,000	5,500
1983	17,000	16,400	15.0	87.7	2,900	19,300	

- <sup>a</sup> Calculated from spring breeding grounds survey.  
<sup>b</sup> Mid-winter less 0.035 mortality (Chapman et al. 1969).  
<sup>c</sup> Percent of total adults seen in flocks with no young.  
<sup>d</sup> Fall flight less mid-winter inventory.

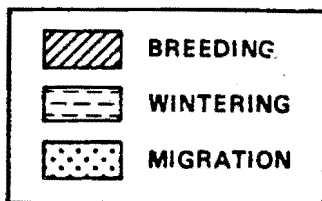


Figure 1. Breeding and Wintering Distribution of Dusky Canada Geese.

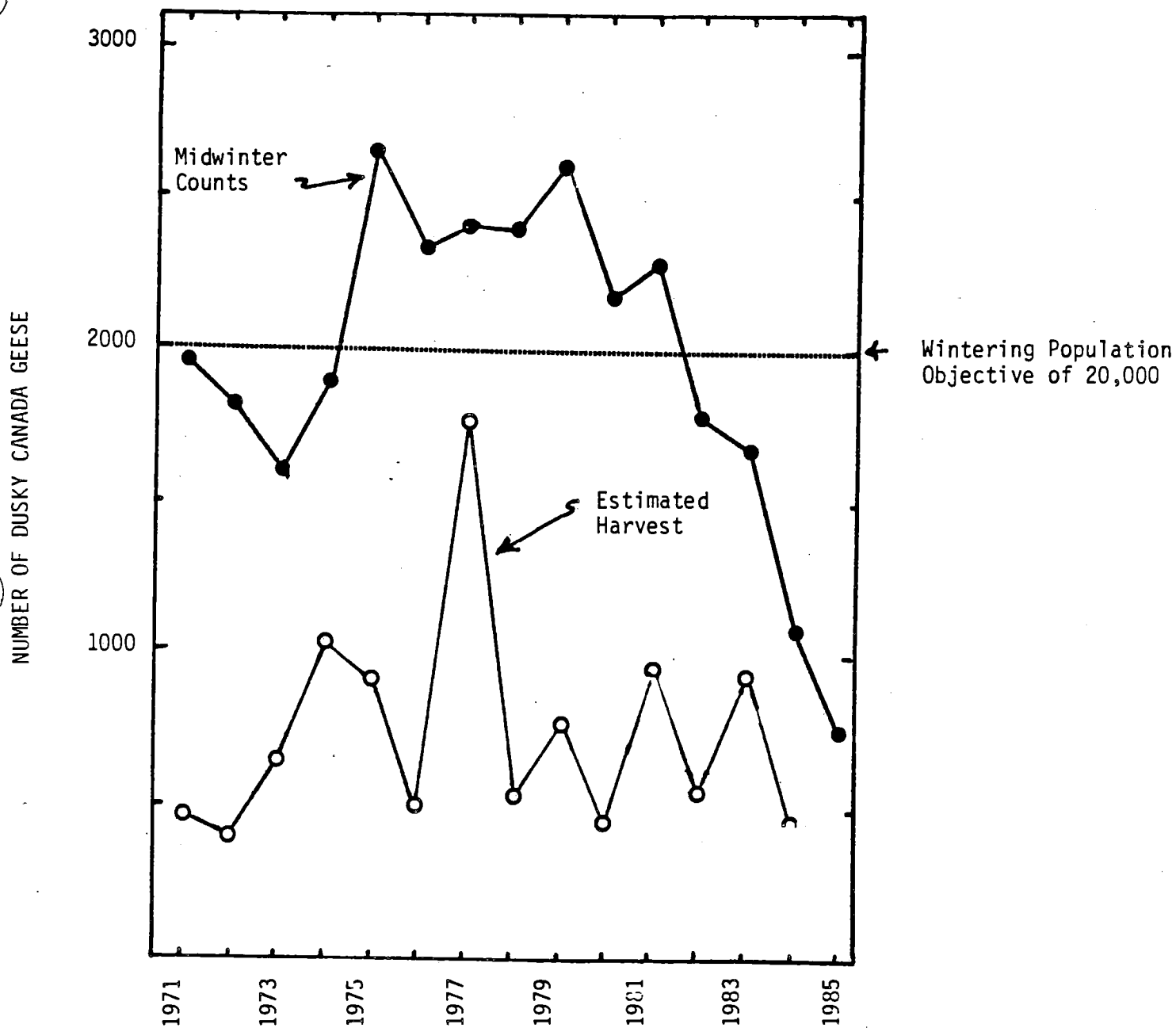


Figure 2. Numbers of dusky Canada geese as estimated during Midwinter Waterfowl Survey 1971-85 (solid circles). Estimated numbers of dusky Canada geese harvested 1971-84 (open circles).

July 1985

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE NORTHERN PINTAIL

### Purpose

This document communicates the objectives, strategies, and priorities for U.S. Fish and Wildlife Service activities for nationwide management of the Northern Pintail (Anas acuta) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead Region for this plan is Region 1 with support from Regions 6 and 7.

### Continental Objectives

1. Achieve a pintail breeding population of 6.9 million birds, as measured by the breeding ground survey.
2. Achieve an annual pintail fall flight of 15.1 million birds.
3. Provide for an annual U.S. - Canada harvest of 1.3 million birds (Table 1) with distribution approximately that of the 1971-80 average harvest (Table 2), as measured by the annual waterfowl harvest survey.

(Note: Current and objective levels of harvests and populations are listed in Table 1 together with rationales and assumptions used in establishment of objectives.)

### National Objectives

1. Achieve a pintail breeding population of 3.0 million, as measured by the annual breeding ground surveys.
2. Achieve an annual pintail Fall Flight of 6.5 million originating in the U.S.
3. Provide for an annual U.S. Harvest of 1.1 million birds (Table 1), as measured by the annual waterfowl harvest survey.

### National Harvest Objectives by Flyways and FWS Regions

Because only 80% of the continental population of pintails is assumed to be estimated by current survey and because those pintail breeding in all or portions of four states are the basis for the breeding population index for the whole of the U.S. (Figure 1), partitioning of either the breeding population objective or the fall flight objectives among flyways and FWS regions is subject to error. The only parameter suited for such partitioning, except for Region 7, is the sport harvest which is measured by nationwide surveys. The percentage distribution of the pintail sport harvest during 1971-80 among the four U.S. administered flyways was:

Pacific Flyway	67.8%
Central Flyway	15.4%
Mississippi Flyway	13.9%
Atlantic Flyway	2.9%

The percentage among the seven Regions was:

Region 1	59.5%
Region 2	11.3%
Region 3	9.9%
Region 4	12.6%
Region 5	1.4%
Region 6	8.7%
Region 7	1.6%

Distribution of the pintail harvest among the states is listed in Table 2.

#### Population Distribution and Status

**Distribution** - While the pintail shares its primary North America breeding habitat with other dabbling ducks in the prairie pothole region, it is also a holarctic nester. Nearly 25% of the fall flight originates from Alaska and northeastern Asia. Major wintering areas in order of importance are the Central Valley of California, the Texas and Louisiana coasts, the west coast of Mexico, and the Playa Lakes region of the Texas Panhandle (Figure 2).

**Status** - The pintail is the second or third most abundant duck in North America, behind only the mallard and, depending upon annual differences in production, the lesser scaup. Long-term survey data indicate the pintail to be the most abundant duck in the Pacific Flyway and second only to the mallard in the Central Flyway.

Breeding population indices from surveyed breeding areas in the U.S. and Canada averaged 5.6 million pintails during 1962-81 and ranged from a low of 4.1 million in 1964 to a high of 10.1 million in 1956. The 1984 index was at an all time low of 3.7 million.

Estimated sport harvest of pintails during 1962-82 averaged 1.3 million ducks, including 0.2 million in Canada and 1.1 million in the U.S. (Figure 1) with unmeasurable subsistence harvests being additional. There were no trends in either country's harvest. The harvest in Mexico and Central America may be significant, but there are no accurate data available.

#### Rationale for Objectives

The Objective statements for Northern Pintail presented in this plan are designed to maintain a large enough population to provide for sport hunting as well as non-consumptive uses. Numerical objectives are based on historical data (1962-81) as presented in Table 1.

#### Problems

**Habitat Loss** - The pintail's major problem is degradation of habitat. Both breeding and wintering habitats are being modified at significant rates by agricultural and urban growth. While most of the pintail's breeding habitat in Alaska remains relatively productive, wetland habitats on U.S. and Canadian prairies have been drained and filled and many streams have been channelized.

Availability of food on the wintering areas has become a greater problem in the last decade. The pintail adapted well to conversion of natural habitat to agricultural fields. Many natural foods were replaced by rice and other crops, but changes in harvest technology, field preparation and genetic advancement have made agricultural food less and less available. Crop depredation by pintails continues to be a problem throughout their range.

The spectacularly large moulting concentrations of pintails using and dependent upon the intertidal areas of the Bering and Chukchi Seas are potentially threatened by oil development and transportation in both adjacent offshore and inland areas.

Winter areas are being lost at a greater rate than breeding habitat. Over half of the continent's pintail use California's Central Valley for a wintering area and a staging area on the way farther south. Historically, this valley contained approximately four million acres of wetland habitat, but flood control and drainage projects have now reduced the wetlands to less than 10% of that acreage. The Texas coast is also undergoing changes in land use and agricultural practices. Overcrowding in the limited available wetland habitat has contributed to outbreaks of botulism, fowl cholera, and lead poisoning in the Central Valley of California, where mortality is measured in the tens of thousands annually. Staging areas in Northern California, Nevada and Nebraska are also plagued by epidemics during both fall and spring migrations. Much of California's wetland habitat is provided by water from agricultural runoff. These areas tend to accumulate toxic concentrates of heavy metals, pesticides and natural compounds.

Population Information Needs - While the ubiquitous and adaptive Mallard (Anas platyrhynchos) has been intensively studied throughout its life cycle and range, the pintail's habitat requirements, rates of survival, and recruitment are relatively unknown. This information is needed to achieve Service objectives.

Recruitment - To meet population objectives, the problem of recruitment must be addressed. Pintails are more attracted to cultivated farmland habitat than other waterfowl. They are early nesters and often choose grain stubble fields, which makes them especially vulnerable to spring farm operations. A study in Manitoba monitored an area where farming operations directly destroyed 57% of all nests in 1956 and 41% in 1957. The pintails' affinity for nesting in areas with little cover facilitates nest destruction by high populations of mammalian and avian predators. Nest destruction also results in hen mortality which further hinders recruitment.

### Strategies

The following list of Northern Pintail management strategies is indexed by priority within FWS regions. The priority scale of 1, 2 and 3 represents high, medium and low priorities, respectively.

#### REGIONAL PRIORITIES

R1 R2 R3 R4 R5 R6 R7 R8 R9

#### I. Maintain and Enhance Habitat

- A. Maintain high quality pintail habitats on lands managed by the FWS, with

	REGIONAL PRIORITIES								
	R1	R2	R3	R4	R5	R6	R7	R8	R9
emphasis on increasing recruitment on areas managed for production.	1	3	1	-	-	1	1	-	1
B. Vigorously enforce MBTA regulations and oversight authority on permit issuance that would impact upon pintails or their habitats.	1	2	2	2	2	1	1	-	1
C. Meet FWS wetland acquisition objectives as identified in the Waterfowl Habitat Strategy Report and encourage acquisition and protection of these lands by other Federal agencies, States, organizations or individuals. The priority for pintails is:									
1. Central Valley	1	-	-	-	-	-	-	-	1
2. Praire potholes and parklands	-	-	1	-	-	1	-	-	1
3. Yukon-Kuskokwim Delta	-	-	-	-	-	-	1	-	1
4. Northern Great Plains	-	-	-	-	-	1	-	-	1
5. Yukon Flats	-	-	-	-	-	-	1	-	1
6. Intermountain West	1	2	-	-	-	2	-	-	1
7. West-Central Gulf Coast	-	1	-	1	-	-	-	-	1
8. Playa Lakes	-	2	-	-	-	-	-	-	1
9. Klamath Basin	1	-	-	-	-	-	-	-	1
D. Provide incentives and encourage protective measures for maintenance and enhancement of pintail habitats on privately owned lands.	1	2	2	2	-	1	1	-	1
E. Enhance habitats and, in nesting areas, increase recruitment of pintails on non-FWS lands through extensive education activities, cooperative agreements, etc.	1	2	3	2	-	1	1	3	1

	<u>REGIONAL PRIORITIES</u>								
	R1	R2	R3	R4	R5	R6	R7	R8	R9
F. Resolve depredation problems so that private landowners will be more likely to allow waterfowl to use their lands.	1	2	3	2	3	2	3	3	2
II. Reduce Non-hunting Loss of Pintails									
A. Implement oil spill plans.	1	2	-	2	-	-	1	-	1
B. Implement disease contingency plans, managing lands to lessen impacts from epizootic diseases.	1	1	1	2	3	1	2	-	1
C. Use non-toxic shot in areas according to criteria.	1	1	1	1	1	1	-	-	1
III. Initiate or conduct research on the following items:									
A. Identify factors affecting the size of the fall flight from Alaska and other production areas.	2	-	2	-	-	2	2	1	2
B. Evaluate the impact on pintail survival and recruitment of wintering habitat losses and depredation.	2	2	3	2	-	3	-	1	2
C. Determine whether, and to what degree, hunting is compensatory and whether thresholds exist above which hunting mortality is additive.	-	-	-	-	-	-	-	1	2
D. Identify factors affecting duckling survival.	2	-	1	-	-	1	3	1	2
E. Determine whether waterfowl disease losses can be reduced through management.	2	2	2	-	-	2	-	1	2
F. Determine the proper use of agricultural tile-drain water in marsh management in the Central Valley of California.	2	-	-	-	-	-	-	1	2
G. Determine socio-economic values of pintail production on privately owned lands.	2	-	2	-	-	2	-	1	1

		REGIONAL PRIORITIES							
		R1	R2	R3	R4	R5	R6	R7	R8 R9
H.	Test the utility of the "pintail management model" to other areas	2	3	2	3	3	2	2	1 2
IV.	Continue to Refine Population and Harvest Survey Methodology.								
A.	Monitor the pintail population and harvest through ongoing continent-wide, nation-wide, and regional surveys and banding programs.	2	2	2	2	2	2	2	- 1
B.	Examine population and harvest surveys and products to determine if estimates may be refined to better reflect the entire population and various components of the populations.	-	-	-	-	-	-	-	1 1
V.	Coordinate Species Management.								
A.	Coordinate intra-Regional and flyway management efforts with State agencies during periodic meetings of the Flyway Councils and Technical Committees.	2	2	2	2	2	2	2	2 1
B.	Coordinate pintail management efforts with Canada and Mexico during periodic meetings between FWS and agencies from those countries.	-	-	-	-	-	-	-	- 1

### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP). The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans, from Regions 1-7.

### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D. C. 20240 (202/254-3207).

July 1985

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Current and objective levels for pintail harvest and breeding population. <sup>1/</sup>

	Mexico South	Current Level			Objective Level		
		U.S.	Canada	U.S. Canada Total	U.S.	Canada	U.S. Canada Total
Harvest <sup>2/</sup>	unmeasured	1,080,000	130,000	1,210,000	1,100,000	180,000	1,280,000
Breeding Population Index <sup>3/</sup>	unmeasured	1,980,000	2,120,000	4,100,000	2,30,000	3,200,000	5,500,000
Fall Flight Index <sup>4/</sup>	unmeasured	—unmeasured—			6,500,000	8,600,000	15,100,000

<sup>1/</sup> The Harvest, Breeding Population, and Fall Flight Objectives were developed independently by the FWS and, therefore, without assurance of concurrence by either Flyway Council or Canada.

<sup>2/</sup> Harvest: The current level of harvest is the approximate 3-year average (1979-81) of the estimated retrieved sport harvest in the U.S. and Canada. Subsistence harvest in both countries as well as the Mexican and Central American harvest are not measured and, therefore, not included. The objective level of harvest is the approximate averages of the retrieved harvests during the 20-year period of 1962-81.

<sup>3/</sup> Breeding Population Index: Current level of the index is the 3-year (1981-83) of birds in surveyed areas. The objective level is based on the 1962-82 average derived from the U.S. and Canadian breeding ground survey areas (Figure 2).

<sup>4/</sup> Fall Flight: The objective level was derived by applying the production ratio for each area survey to the 20-year breeding population average for those survey areas.

Table 2. Percentage distribution of the U.S. retrieved pintail harvest by Flyway and State during 1971-80 (Carney et al. 1983).

Pacific Flyway		Central Flyway		Mississippi Flyway		Atlantic Flyway	
Alaska	1.5	Montana (E)	0.1	Minnesota	1.1	Maine	Tr
Washington	4.0	North Dakota	0.8	Wisconsin	0.7	Vermont	Tr
Oregon	4.9	South Dakota	0.8	Michigan	0.4	New Hampshire	Tr
Idaho	1.1	Wyoming (E)	0.1	Iowa	0.5	Massachusetts	Tr
Montana (W)	0.7	Nebraska	0.5	Illinois	0.6	Connecticut	Tr
Wyoming (W)	Tr	Colorado (E)	0.2	Indiana	0.1	Rhode Island	Tr
California	48.1	Kansas	1.1	Ohio	0.1	New York	0.3
Nevada	1.4	New Mexico (E)	0.3	Missouri	0.5	Pennsylvania	0.1
Utah	5.1	Oklahoma	0.4	Kentucky	Tr	West Virginia	Tr
Colorado (W)	Tr	Texas	9.7	Arkansas	0.5	New Jersey	0.3
Arizona	0.9			Tennessee	0.2	Delaware	0.1
New Mexico (W)	Tr			Louisiana	8.9	Maryland	0.2
Hawaii (no season)				Mississippi	0.1	Virginia	0.2
				Alabama	0.2	North Carolina	0.5
						South Carolina	0.3
						Georgia	Tr
						Florida	0.6
Total	67.8	Total	15.4	Total	13.9	Total	2.9

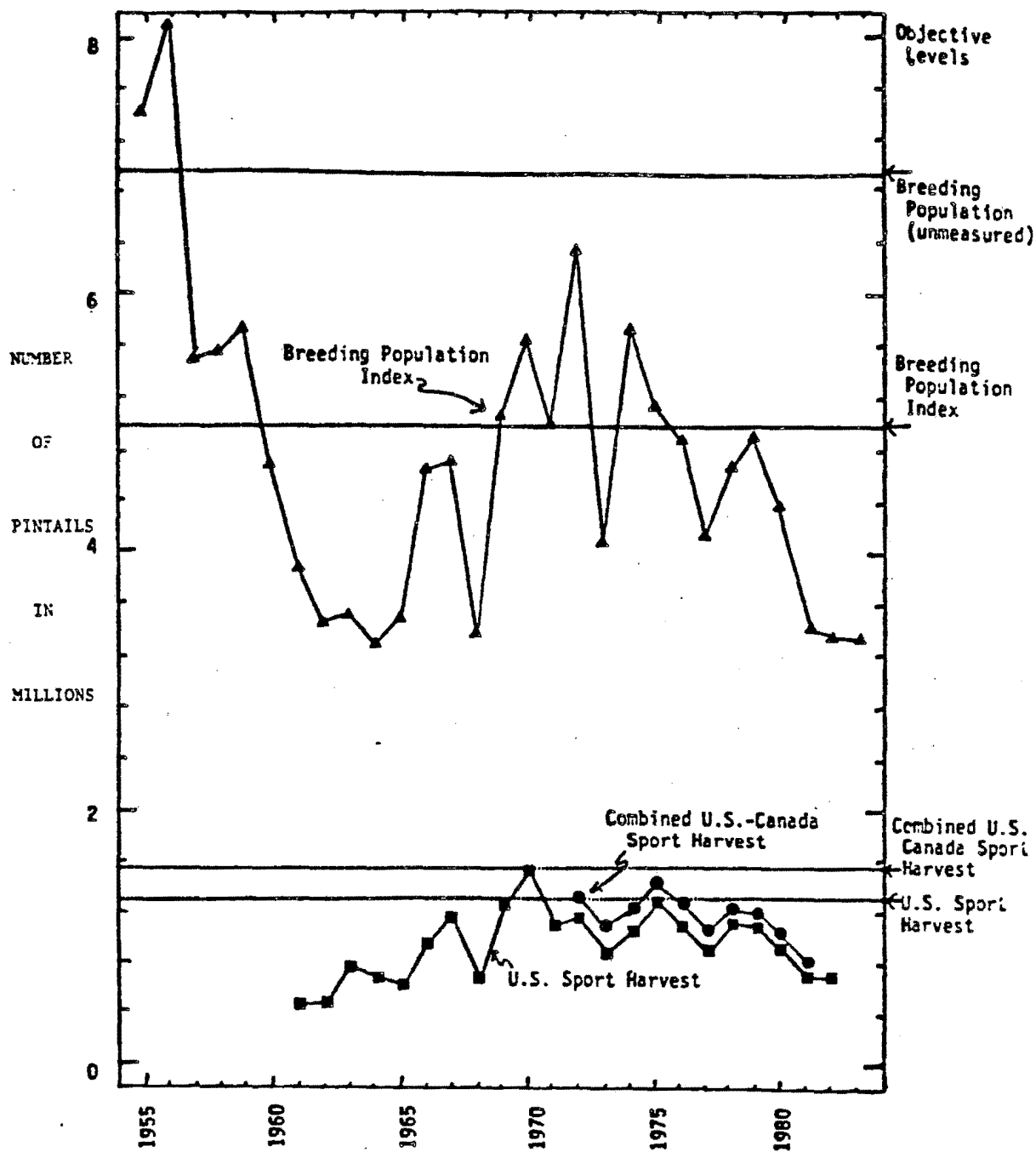
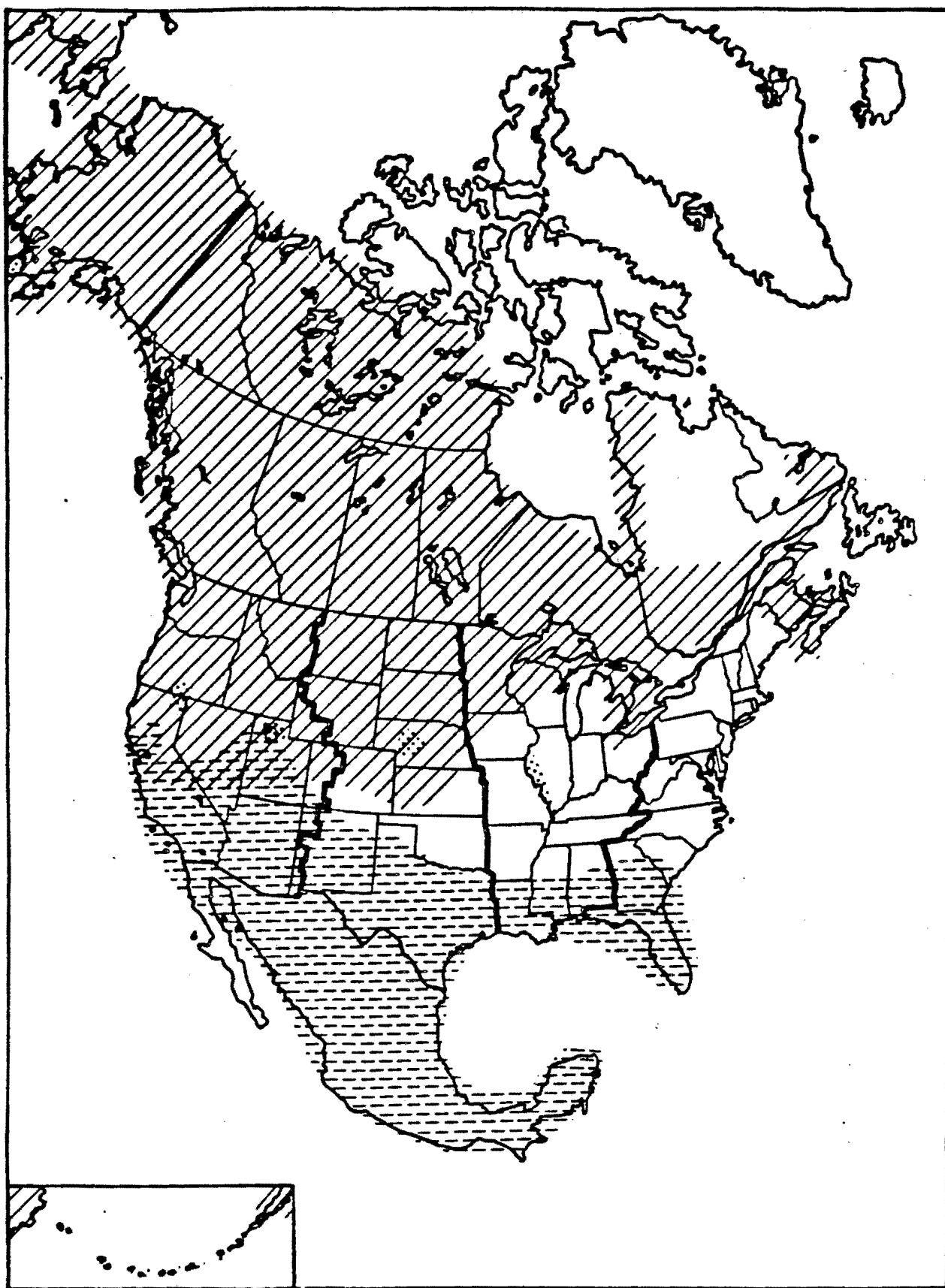


Figure 1. Historic and objective levels for various parameters of the North American Population of the Pintail. (See Table 1 for criteria and rationale).



-  BREEDING
-  WINTERING
-  MIGRATION

Figure 2. Breeding Migration and Winter Distribution of the Northern Pintail.

MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE  
EASTERN MID-CONTINENT POPULATION OF WHITE-FRONTED GEESE

Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Eastern Mid-Continent (EM-C) Population of the White-Fronted Goose (*Anser albifrons frontalis*) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead Region or Office for this plan was Region 4 with support from Regions 3 and 6.

National Objectives

- . Maintain population indices between 50,000 and 80,000 EM-C White-fronts based on 3-year running averages of indices from coordinated mid-December surveys (Table 1).

Mississippi Flyway Objectives

- . Maintain population indices between 50,000 and 80,000 EM-C White-fronts in the Mississippi Flyway based upon 3-year averages of indices from coordinated mid-December surveys.
- . Manage for no change from recent (1976-82) geographic and temporal distributions as long as the population is within the 50,000 to 80,000 objective level.
- . Provide maximum recreational use consistent with population and distribution objectives.

FWS Regional Objectives

Region 4 has adopted the Mississippi Flyway objectives.

Population Distribution and Status

Distribution - The Eastern segment of the Mid-Continent (EM-C) population of White-fronted geese breed generally in the Northwest Territories of Canada from Hudson Bay west. Their autumn migration routes include important staging areas in Eastern Saskatchewan, Manitoba, and North Dakota. Almost all are in Louisiana during the winter (Figure 1). The known range is illustrated in Figure 2.

Status - EM-C White-fronts in the Mississippi Flyway during mid-December 1982, 1983, and 1984, averaged approximately 71,200 (Table 1). Indices to the population in Louisiana have also increased substantially since 1953, and in 1984 the index exceeded 75,000. Much of the indicated population increases occurred during 1970 to 1979 when management programs, including hunting regulations, were essentially the same as in 1981-84. Continuation of these programs is expected to foster additional increases in the population. Based upon current information, some increases in EM-C White-fronts can be accommodated. There are no known limits in habitats for breeding, autumn staging or

wintering. White-fronts generally are accepted, or at least tolerated, on private lands and no serious depredations complaints have been associated with the EM-C population. Additional birds may provide additional recreation. However, White-fronts are especially vulnerable to epizootics, e.g., avian cholera, which are considered more virulent during periods of stress such as is associated with crowding. Therefore, the recommended upper limit is tentative. Additional harvest opportunity will be considered and the objective will be reassessed when the population index reaches or exceeds 80,000.

### Rationale for Objectives

The objective statements for EM-C geese presented in this plan are designed to increase the winter indices of birds while maintaining current temporal and harvest patterns of distribution. Most of the EM-C geese concentrate in Louisiana during the winter and 84 to 90 percent of the harvest occurs in that State. These historic patterns of distribution and harvest will be maintained until the indices exceed 80,000 birds, at which time management programs will be reviewed.

### Problems

The breeding range of EM-C White-fronts is extensive. However, the breeding habitat used is relatively restricted and includes river deltas which are especially vulnerable to degradation by development activities. Any degradation may affect populations.

Large numbers of migratory birds, including EM-C White-fronts, stage in the Rainwater Basin of Nebraska during late February, March, and early April each year. These birds are "stalled" by the later breakup of ice in suitable areas farther north. This is a fertile agricultural area in which waste corn, soybeans, small grains, and green winter wheat or alfalfa provide an abundant food supply for these staging birds. Unfortunately, about 70 percent of the Rainwater Basin marshes have been drained during the past 25 years and the remainder have been degraded by diversion of inflows, pollution run-off, siltation, etc. Furthermore, the Platte River has been degraded as a habitat by reduced flows resulting from diversions for irrigation. These reductions in the quantity and quality of south-central Nebraska waterfowl habitat may have contributed to outbreaks of avian cholera, in each of the years 1975-82. During this period an estimated 41,000 - 48,000 White-fronts (including both EM-C and Western Mid-Continent Populations) died.

### Strategies

The following list of EM-C White-fronted goose management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium and low priorities, respectively.

July 1985

REGIONAL PRIORITIES  
R4 R3 R6 R8 R9

I. Support Mississippi Flyway Council Objectives

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| A. Maintain current management programs, including hunting regulations as long as the 3-year index remains between 50,000 - 80,000 birds.                                   | 1 | 1 | 1 | - | 1 |
| B. Determine probable causes and make appropriate adjustments in management programs should a serious decline be detected, or if the 3-year index falls below 50,000 birds. | 1 | 2 | 1 | - | 1 |
| C. Consider increasing the daily bag limits to at least three geese when the 3-year average index reaches or exceeds 80,000.  | 1 | 2 | 2 | - | 1 |
| D. Discourage management measures specifically designed to delay autumn migrations while the 3-year population index remains below 80,000 geese.                            | 1 | 1 | 1 | - | 2 |
| E. Consider programs to attract EM-C geese to other than traditional areas, once the 3-year index exceeds 80,000 birds.   | 2 | 2 | 2 | - | 3 |

II. Protect Habitats

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| A. Discourage programs and actions which degrade the breeding habitats used by EM-C geese.  | 2 | 2 | 2 | - | 3 |
| B. Discourage programs and activities which degrade the quality of migrating and wintering habitats (special attention to wintering habitats in Louisiana).               | 1 | 2 | 2 | - | 3 |
| C. Reduce the risk of epizootics by preventing further loss of, and improving where possible, the Rainwater Basin and Platte River habitats used by spring-staging geese. | 3 | 3 | 1 | - | 3 |

III. Increase Biological Information

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| A. Conduct basic research to reduce the annual losses attributed to avian cholera. | 3 | 3 | 1 | 1 | - |
|--|---|---|---|---|---|

July 1985

	REGIONAL PRIORITIES				
	R4	R3	R6	R8	R9
B. Determine the best techniques to trap geese on the wintering grounds.	2	3	3	3	3
C. Ascertain the impact of lead poisoning within major harvest areas.	1	2	2	3	2
D. Study and document the wintering ecology of EM-C geese in Louisiana.	2	3	3	2	3
E. Continue conducting surveys to monitor this population and its habitats.	1	2	1	-	1

#### Implementation

The objectives and strategies in this plan are consistent with the FWS Regional Resource Plans (RRPs) developed by the Regions covering portions of the EM-C White-front range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

#### Sources

This plan was derived from the U.S. Fish and Wildlife Service Regional Resource Plans for Region 4 and 6.

#### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Estimates of White-fronted geese in the Mississippi Flyway in Mid-December

Year	Estimated Total	3-Year Running Average
1973	43,000	
1974	40,400	
1975	53,400	45,600
1976	50,400	48,100
1977	53,100	52,300
1978	49,300	50,900
1979	59,000	53,800
1980	67,500	58,600
1981	65,600	64,000
1982	62,000	65,000
1983	70,300	66,000
1984	81,300	71,200

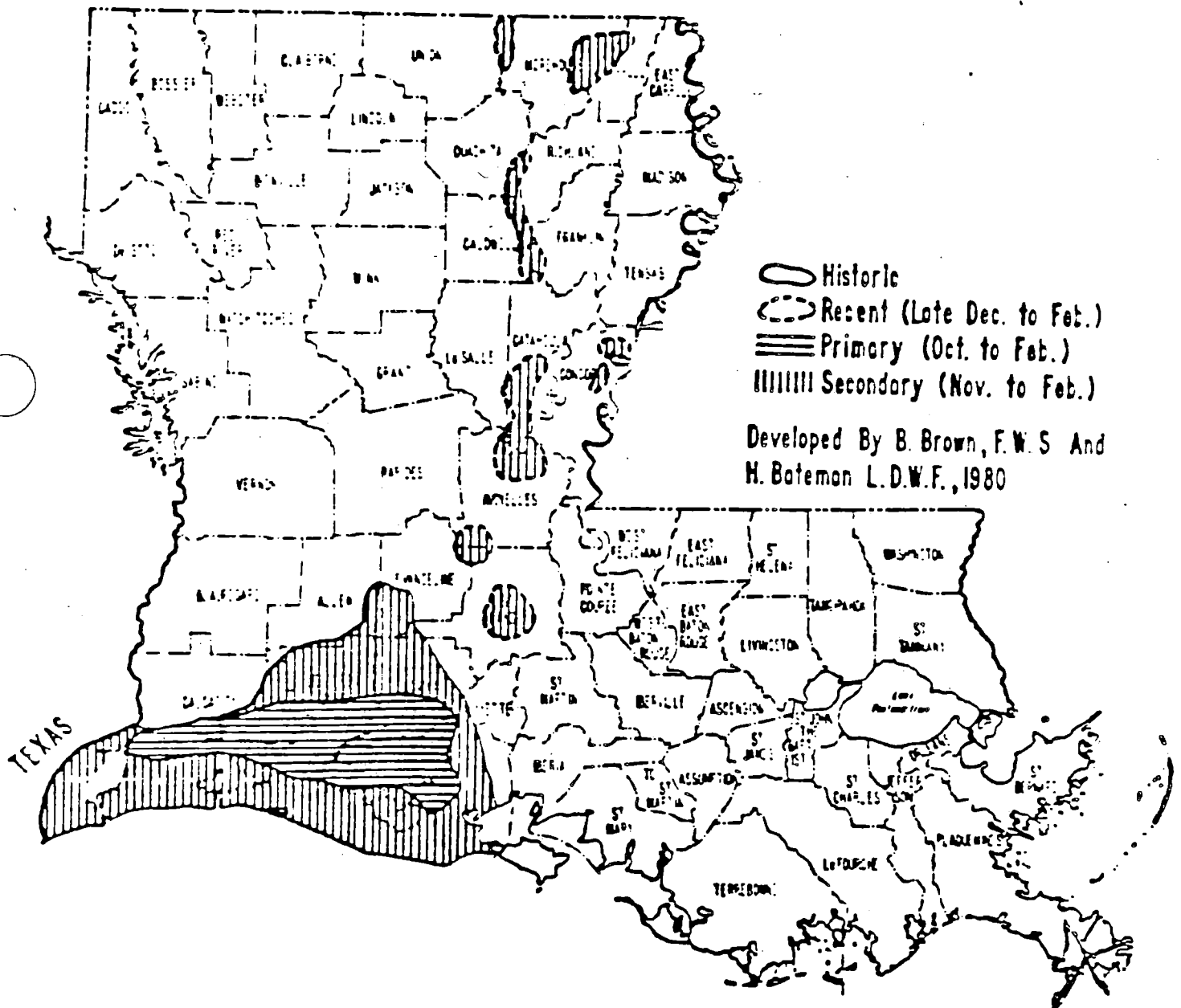


Figure 1 - WINTER RANGE OF EASTERN MID-CONTINENT  
WHITE - FRONTED GEESE IN LOUISIANA AND TEXAS

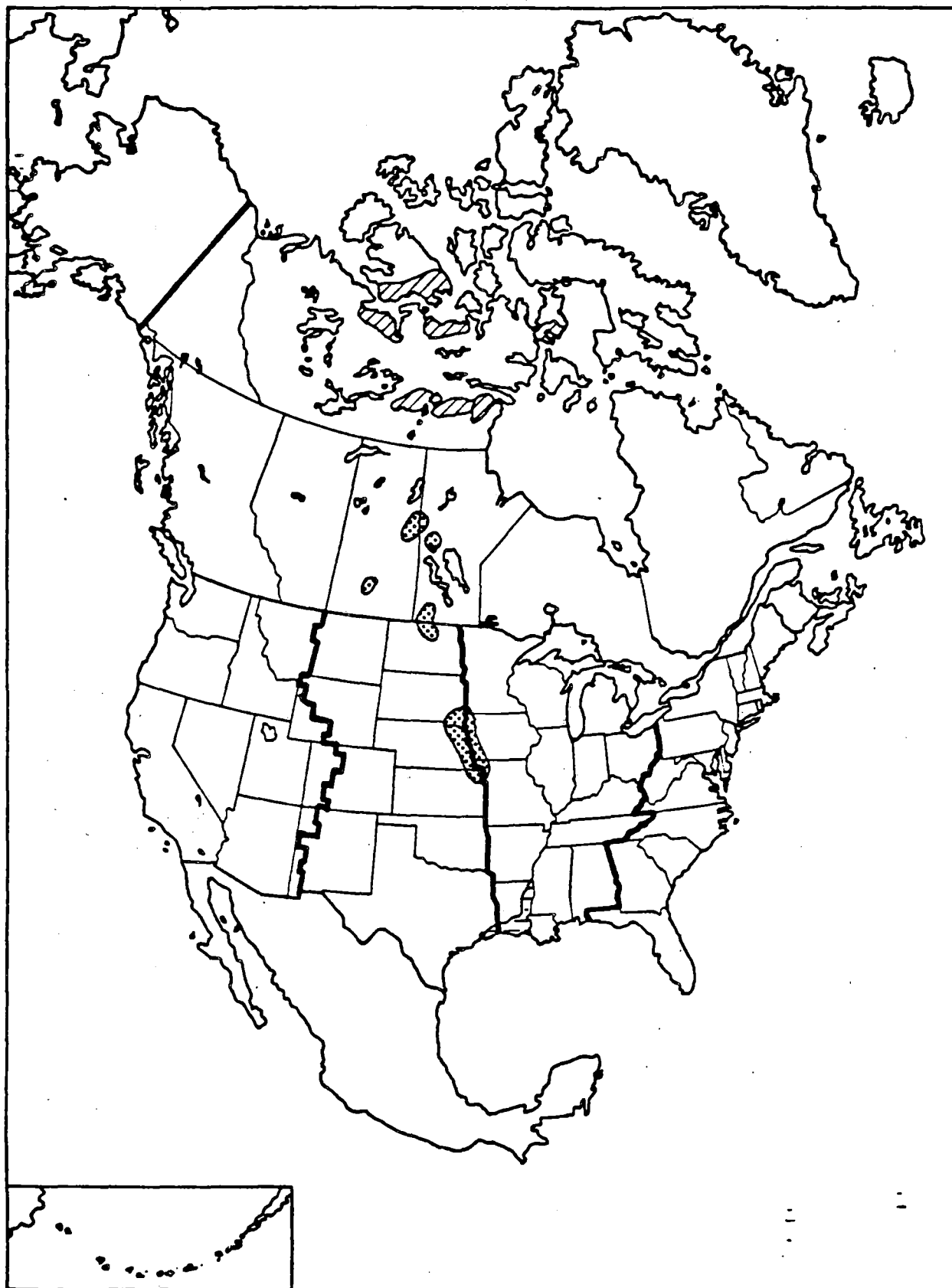


Figure 2  
Breeding, Migration, and Winter Range of Eastern  
Mid-Continent White-Fronted Geese in North America

MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE  
PACIFIC FLYWAY POPULATION OF GREATER WHITE-FRONTED GEESE

Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Pacific Flyway Population (PFP) of Greater White-fronted Geese (Anser albifrons frontalis) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service and which are partially derived from prior cooperative planning efforts with State agencies in the Pacific Flyway. Lead for this plan was the Office of Migratory Bird Management with support from Regions 1 and 7.

National Objectives

The breeding, migration, and wintering distributions of this population of White-fronted Geese are limited to the Pacific Flyway (see Pacific Flyway objectives).

Pacific Flyway Objectives

- . Maintain a 3-year-average population index of 300,000 White-fronted Geese, as measured during the November Dark Goose Survey in California and Oregon, with corresponding average breeding populations of 140,000 geese and average annual harvests of 110,000, of which 100,000 would be in the U.S. (Table 1).

FWS Regional Objectives

- . Maintain the present distribution of populations of breeding White-fronted Geese in Region 7.
- . Maintain habitats in sufficient quantity and quality (in Regions 1 and 7) to support the population distribution objectives.
- . At population objective levels, maintain a sport harvest of 65,000 White-fronted Geese in Region 1 and a sport-subsistence harvest of 35,000 in Region 7.

Population Distribution and Status

Distribution - Those White-fronted Geese, or whitefronts, nesting in Alaska are divided into Pacific Flyway and Western Mid-continent Populations based on their different migration patterns and wintering areas. PFP whitefronts nest entirely within western Alaska, with about 95% breeding and summering on the Yukon-Kuskowkwim Delta and the remainder in the Innoko River Valley and lowlands of Bristol Bay and Cook Inlet. In fall, PFP whitefronts may fly nonstop from Alaska to Oregon and California where most initially congregate in the Klamath Basin before moving south to wintering areas. While some whitefronts winter in the Klamath Basin, most will winter in the Central Valley of California with a smaller but unmeasured proportion continuing on to the western mainland coast and highland of Mexico. Figure 1 shows primary nesting areas, migration stopovers and routes, and wintering areas.

Status - There is no survey that measures the total numbers of PFP whitefronts during any period of their life cycle. An index to the fall population has been obtained from peak numbers observed by FWS staff on the Klamath Basin NWR complex and immediate areas. An extensive fall goose survey was initiated in 1979 for the purpose of obtaining better estimates of the total populations of whitefronts and while these counts find approximately a fourth to a third more birds than found during the counts of peak numbers in the Klamath Basin, there is close agreement in trends for the 5 years of comparison. Neither the counts of peak numbers nor those from the extensive survey include birds that are in migration or have passed through the area and are already wintering in Mexico. Peak numbers of whitefronts in the Klamath Basin approached 500,000 birds during 1966 and 1967 but have since declined to fewer than 100,000 birds (Figure 2). While this decline is believed to reflect a true decrease in the overall population, some of it could occur if a greater percentage of birds were to move through the Klamath Basin and go into Mexico without stopping in surveyed areas. Winter Waterfowl Surveys provide a less reliable measure of whitefront numbers; nonetheless, they corroborate the decline.

Whitefronts are hunted throughout their range and, excepting March and April, through much of the year. Measured sport harvests of whitefronts in the Pacific Flyway states have somewhat followed the trends of the population. When peak numbers occurred in 1966 and 1967, flyway-wide harvests averaged about 70,000 geese; but since harvest restrictions were imposed in 1979 they have averaged only 21,000 geese (Figure 2). The sport harvest in Canada is measured but small, about 200-500 birds per year. The sport harvest in Mexico is not measured. However, because 9% of the recoveries from whitefronts banded on the Yukon-Kuskokwim Delta during 1957-69 came from Mexico, the harvest was significant and may have increased since those bandings.

Estimates of subsistence harvest are crude, being derived from only two surveys. The spring through fall harvest of whitefronts on the Yukon-Kuskokwim Delta was estimated to be 22,600 birds in 1963 when bird numbers were high, but the spring harvest in 1981 was estimated to be only 5,876 birds. Eggs were also harvested but not included in the estimates of geese killed.

#### Rationale for Objectives

The population objective is intended to restore this population of White-fronted Geese to historic levels and, thereby, increase hunting opportunities.

#### Problems

Major existing and potential problems for management of PCP whitefronts include: (1) lack of adequate data on which to make informed management decisions (e.g., delineation of high nesting density and molting areas, winter distribution in Mexico, temporal and spatial distribution and harvest rates of various flocks that could be subjected to particular problems), (2) probable excessive mortality and continued decline of populations, and (3) disturbance and alteration of essential habitats throughout their range.

Inadequate Ecological Information - A major problem is the inability to make informed decisions concerning the management of whitefronts because of inadequate information

on certain aspects of the ecology, distribution, and habitat requirements of breeding birds; habitat requirements of molting and staging birds; distribution and habitat requirements of wintering and migrating birds; and the magnitude and nature of mortalities, particularly hunter harvests.

**Probable Excessive Mortality** - Of primary concern to wildlife managers and hunters is the major decline in numbers of whitefronts that has occurred since the mid 1960's. While the long-term decline continues, there may have been a recent stabilization or even a reversal as a result of the restrictive sport seasons initiated in 1979 and efforts by Native groups to reduce subsistence harvests on certain geese. While many factors could contribute to the decline, excessive harvests are likely to be the major cause and the one most quickly corrected from the standpoint of the regulated sport harvest. Because the subsistence harvest of waterfowl in Alaska is measured only approximately, its role in the decline is only deduced as being an important contributing factor. The percentage of whitefronts spending the winter and being harvested in Mexico is not known but should be determined if meaningful management decisions are to be made.

**Habitat Disturbance and Alteration** - Some 50 percent of the most important goose nesting habitat within 15 miles of the coast in the Yukon Delta NWR, will be conveyed to private Native ownership. About 28 percent of the entire Y-K Delta, which contains 46 villages, will be transferred to Native ownership in a checkerboard pattern of refuge inholding. With a rapidly increasing human population in most villages, an expansion of commercial and recreation developments near the villages is expected. Oil and gas exploration, development, and attendant activities are likely on the Y-K Delta and in offshore areas, including adjacent Norton Sound where lease sales have been held. There is also a high potential for development of a commercial reindeer industry with probable adverse impacts on nesting waterfowl and their habitat.

Only 4 percent of the original wetlands in the Central Valley of California remain and are comprised of duck clubs and state and federal managed areas. Private wetlands and goose pastures continue to be converted into agricultural lands, some of which are unsuited for wintering whitefronts. Changes in agricultural practices will continue to occur which results in reduced availability of waste grains, an important food source for most waterfowl.

Wetland losses to agricultural developments and the extensive use of certain persistent pesticides pose undetermined problems for whitefronts wintering in Mexico. Unfortunately, our current knowledge of PCP whitefront distribution and habitat use in that country is deficient.

Sufficient habitats to sustain the population objective are present but may be increasingly difficult to maintain when occupied by the current small population. Most wintering habitats and some migration stopovers of PFP whitefronts in the conterminous States are privately owned. Should opportunities to hunt waterfowl there be diminished, as is the short-term prospect with whitefronts, the incentive for maintaining these habitats will also be diminished. In a somewhat similar situation, about half of the nesting habitat has been or will be conveyed to Native ownership. These privately-owned lands have been managed cooperatively with the Yukon Delta NWR, with wildlife being a primary consideration so that traditional lifestyles could be retained. Losing opportunities to use geese and other waterfowl resources of the Delta could also diminish

the importance of management for wildlife and increase the likelihood for an influx of incompatible land uses.

Table 2 highlights the use of the various areas by PCP whitefronts, their status, and threats to continued maintenance of the population.

### Strategies

The following list of PCP White-fronted Goose management strategies is indexed by priority for FWS regions. The priority scales of 1, 2, and 3 represents high, medium, and low priorities, respectively.

#### REGIONAL PRIORITIES

R1	R7	R8	R9
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#### I. Harvest guidelines.

- A. Harvests of whitefronts would be by hunters in both summering and wintering areas with neither group being given preferential use at the expense of the other. Various harvest schemes will be employed to effect desired levels and distribution of harvests. There will be no hunting of this population in the U.S. when the 3-year-average index of the fall population is below 95,000 geese. Resumption of hunting will not be considered until the average index rises above 120,000 geese.

1	1	-	1
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- B. Provide for regulated spring and summer subsistence harvests of whitefronts consistent with size and distribution of populations and other appropriate users by amending the Migratory Bird Treaty with Canada.

3	1	1	-
---	---	---	---

#### II. Provide habitat of adequate quantity and quality.

- A. Central Valley - Continue current FWS wetland easement acquisition program and USDA Water Bank in Grasslands, Butte Sink and other key wintering areas. Eventually acquire fee title to both Butte Sink and Grasslands if easement incentive is not sufficient and owners desire to sell out in fee title.

1	1	-	1
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- B. Initiate Federal legislation flyway-wide that would establish property tax payments on wetlands as a tax credit against Federal income tax.

1	-	-	1
---	---	---	---

July 1985

REGIONAL PRIORITIES  
R1    R7    R8    R9

- |   |                         |
|---|-------------------------|
| <p>C. Yukon-Kuskokwim Delta - Preserve via land exchange and/or easements the "22g" lands and other inholdings conveyed to Natives along entire coastal strip of Y-K Delta nesting habitat within 15 miles of coastline between Yukon and Kuskokwim River mouths. In the interim the FWS should negotiate Alaska Land Bank agreements with 46 Native village corporations throughout the entire Y-K Delta and for those Villages in the Innoko River Valley to provide habitat protection in exchange for FWS assistance in land-use planning; controlling trespass; fire, fish, and wild-life conservation; and, on Native lands, exemption from taxation and adverse actions.</p> | <p>-    1    -    1</p> |
| <p>D. Central Valley - Develop and propose legislation to ensure minimum water needs for waterfowl management in the Central Valley. This may involve amendments to the California Central Valley Project Act and should provide sufficient fall-winter water for State and Federal waterfowl areas as well as private hunting clubs with dedicated lands to winter waterfowl management.</p>   | <p>1    -    -    1</p> |
| <p>E. Delineate high density White-fronted Goose nesting habitat and determine compatibility of goose nesting with reindeer grazing. If incompatible, make formal determination and prohibit reindeer grazing in high density coastal nesting areas.</p>  | <p>-    2    2    -</p> |
| <p>F. Klamath Basin - Continue to manage Klamath Basin NWR-complex primarily to provide food and sanctuary for fall and spring staging and wintering whitefronts. Monitor agricultural practices and cropping patterns on surrounding lands to detect potentially adverse changes.</p>  | <p>2    -    -    -</p> |
| <p>G. Upper Cook Inlet - Encourage State legislature to designate Redoubt Bay wetlands as State Waterfowl Refuge so as to increase protection from oil, gas, coal, and recreational developments.</p>   | <p>-    1    -    -</p> |

REGIONAL PRIORITIES

R1	R7	R8	R9
----	----	----	----

H. Upper Cook Inlet - The FWS Habitat Resources program capability should participate in all land and water resource development project reviews and studies to minimize impacts on key tidal marshes in Upper Cook Inlet. This would enable FWS to have a major influence on design and construction of any water-related project in Upper Cook Inlet. Tidal marshes in particular would be given maximum protection from dredging, filling and other activities that are inevitable with expanding energy, economic and recreational developments. The continuous monitoring of the status of key tidal marshes via project reviews and liaison with State agencies is needed. This could result in identification of illegal and unauthorized dredging, filling and other construction activities and would allow FWS to provide information to the state for its Coastal Management program on habitat and important trends at no additional cost.				
	-	1	-	2
I. Canada - Encourage Federal and Provincial agencies of Canada to identify and protect those habitats used by whitefronts in migration.				
	-	-	-	1
J. Mexico - Encourage Federal agencies and DUMAC to identify and protect those habitats used by PCP whitefronts in winter.				
	-	-	-	1
III. Improve coordination of management activities.				
A. Coordinate management and research activities among Regions 1, 7, 8, and 9, with State and Provincial agencies during the Pacific Flyway Council/Study Committee meetings.				
	1	1	1	1
B. Encourage greater participation by Natives of the Y-K Delta and sportsmen and landowners of Klamath Basin and Central Valley in planning processes related to goose management.				
	1	1	-	3
C. Encourage greater participation by Mexico in goose management.				
	-	-	-	1

REGIONAL PRIORITIES  
R1   R7   R8   R9

- IV. Obtain better information on harvests and status of the population and its habitats.
- A. Expand and improve survey and research programs on whitefronts during migration and on wintering grounds, with particular emphasis of distribution and harvests of various subpopulations, habitat status and needs.
- B. Central Valley - Conduct research on (1) the farming techniques (e.g., burning, plowing, flooding, winter seeding) on timing and extent of use of Central Valley agricultural lands by geese and (2) methods to improve agricultural lands and (3) the potential for using waste water to benefit whitefronts.
- C. Determine the magnitude, species composition, location and consequences of subsistence harvests and relationship to other causes of mortality of White-fronted Geese during the spring and summer with emphasis of harvests on the Y-K Delta.
- D. Continue and refine operational surveys of fall populations and harvests.
- E. Initiate research into the ecology of waterfowl disease in California so that findings might be used to minimize the impacts of avian cholera on geese.
- F. Determine effects of grazing by reindeer on nesting habitat of whitefronts and conditions under which grazing must be prevented or may be made acceptable.
- V. Improve public understanding about these geese.
- A. Initiate information and education programs to publicize the importance of and encourage protection of nesting, staging, and wintering habitats of whitefronts. Principal target groups would include the Migratory Bird Conservation Commission, borough planners, administrators of the Section 10/404 wetland permit

1   2   1   1

2   -   1   -

-   1   1   -

1   3   2   1

2   3   1   -

-   2   2   -

July 1985

REGIONAL PRIORITIES

R1 R7 R8 R9

program, and State and Federal energy development and land disposal agencies. Additionally, in Alaska this would include Coastal Zone Management Program administrators, Native leaders, and Alaska Board of Fisheries and Game. In California this would also include Bureau of Reclamation, Corp of Engineers, Department of Agriculture, water user districts, sportsmen groups, and the California Fish and Game Commission.

- 1 1 -

- B. The Service should develop and implement a bilingual information and education program keying on the Yupik Eskimos in the 46 Y-K Delta villages, teaching concepts of wildlife management and the importance of habitat in maintaining waterfowl and other fish and wildlife populations which are important to their subsistence lifestyle. This would require a long-term program to obtain measurable results as reflected by changes in attitudes toward wildlife and habitat. This strategy would result in informed decisions by residents of 46 villages who have control over more than 5 million acres of Y-K Delta habitat via their Native corporations. Secondarily Athabascan Indians of interior Alaska need parallel programs.

- 1 - -

Implementation

The objectives and strategies in this Plan are consistent with FWS Regional Resource Plans (RRPs) developed by Regions covering portions of the Pacific Flyway Population of the White-fronted Goose's range. The Regions will use the detailed operations plans in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Service Regional Resource Plans for Regions 1 and 7 and from the Pacific Flyway Management Plan for the Pacific Flyway Population of White-fronted Geese (Drafts 1979 and 1985) that were prepared cooperatively by the Pacific Flyway Council and FWS.

July 1985

For Further Information Contact:

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240; 202/254-3207.

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Current and objective levels for the Pacific Flyway Population of white-fronted geese.\*

	Current (1979-82)				Objective			
	U.S.	Canada	Mexico	Total	U.S.	Canada	Mexico	Total
Harvest	?	?	?	?	100,000	1,000	9,000**	110,000
(Wintering Areas)	(21,000)***	(200)	(?)	(?)	(65,000)	(1,000)	(9,000)	(75,000)
(Summering Areas)	?			(?)	(35,000)			(35,000)
Breeding Population	?			?	140,000			140,000
Fall Flight	98,000	0	0	?	350,000			350,000

\*A draft Pacific Flyway Management Plan for the Pacific Flyway Population of White-fronted Geese identified only objectives for a Fall Flight Index (as measured by the 3-year-average of flyway-wide goose surveys conducted in early October) and for a harvest (as measured by the FWS for the sport harvest and a yet-to-be-devised system for measuring the subsistence harvest). The breeding population objective in this plan was developed independently by the FWS and therefore without assurances of agreement by the Pacific Flyway Council. Neither Mexico nor Canada have been involved with establishing harvest objectives, and they may also have differing views. The breeding population objective was extrapolated from Fall Flight and Harvest Objectives using the following rationale and assumptions: That the average fall flight would be comprised of 120,000 young (35%); 140,000 adults (75% were successful in rearing to flight 2.3 young per pair), and 90,000 subadults.

\*\*The FWS's lack of information regarding the percentage of PCP whitefronts wintering and harvested in Mexico makes this 8% allocation of harvest presumptuous.

\*\*\*Includes regulated fall harvest in Alaska.

Table 2. Important habitats of the Pacific Flyway Population of white-fronted geese; their status and threats. Location of areas are shown in Figure 2 and identified by corresponding letters.

Area	Type of Use	Population Estimate	Habitat Condition and Threats
<u>Alaska</u>			
A. Yukon-Kuskokwim Delta	Nesting, molting	95%+ of total	Partially Yukon NWR; majority of land being transferred to private ownership; reindeer grazing poses major threat.
B. Innoko River Valley	Sub-adult molting	Several thousand	Partially Innoko NWR; some private land.
C. Palmut Slough	Fall staging	1000+	Proposed as State Refuge; currently Federally managed; some private lands.
D. Bristol Bay Lowlands	Nesting	Several thousand	Some National Monument; mix of state, private, federal lands.
E. Alaska Peninsula (Naknek R., Egegik, Cinder R. and Ugashik tidelands)	Spring and prob-fall migration	Spring-25,000+ Fall-unknown	Potential oil contamination if drilling occurs in Bristol Bay; classified as State Critical Habitat; increasing disturbance from aircraft.
F. Upper Cook Inlet (Susitna Flats Trading Bay, and Palmer Bay Flats)	Isolated nesting and molting, spring and fall migration	Spring and fall migration- 10,000+ total	All areas classified as State Refuge; increasing human disturbance.
(Redoubt Bay)	Molting and nesting	Summer-1,200+ geese in 1979	Possible conversion to small private holdings; tule goose nesting area.
(Chickaloon Flats)	Spring and fall migration	10,000+ fall Spring unknown	Managed by State & Federal coop. agreement; increasing disturbance from aircraft.
(Kalgin Island)	Spring and fall migration	Unknown	Classified as State Critical Habitat.
(Kenai & Kasilof River Deltas)	Spring and fall migration	Unknown	Urban expansion; increasing human disturbance.
G. Copper/Bering River Deltas	Spring and fall migration	Peak numbers up to 100,000	National Forest lands managed under State-Federal coop. agreement; State Critical Habitat; oil pollution, coal development threat. Native land selections include Bering River coal field.
H. Yakutat Forelands Southeast Alaska	Spring and fall migration	Unknown	National Forest lands; oil pollution threat; increasing human disturbance.
(Rocky Pass)	Spring migration	Several thousand	Scheduled for habitat protection under RARE II Forest Service class.
<u>British Columbia</u>			
I. SW British Columbia	Spring and fall migration	6,000	Habitat threatened by urbanization.
<u>Oregon</u>			
J. Columbia River (Sauvie Island)	Fall migration	Total use-1,000	State management area and private land.
K. Harney Basin	Spring migration	Total use-3,000	Malheur NWR and private land.
<u>California</u>			
L. Klamath Basin	Fall-spring migration; wintering	Nearly entire pop. fall; 20,000 peak pop. spring; 15,000 wintering	Klamath Basin NWR complex; private agricultural land. Mostly secure.
M. Sacramento Valley	Wintering	40% of population	Sacramento Valley NWR complex, private land; more efficient farming techniques.
N. Sacramento-San Joaquin River Delta	Wintering	20% of population	Relatively high threats due to water shortage, more efficient farming techniques.
O. San Joaquin Valley	Wintering	20% of population	Relatively high threat due to water shortage/competition and more efficient farming techniques.
<u>Mexico</u>			
P. Sinaloa, Sonora, Chihuahua, Durango	Wintering	Unknown, but perhaps 10% of population	Agricultural practices may result in high contaminant levels. Status unknown.

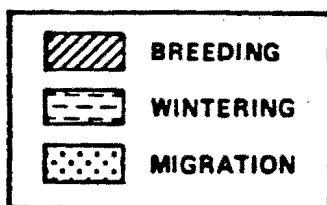
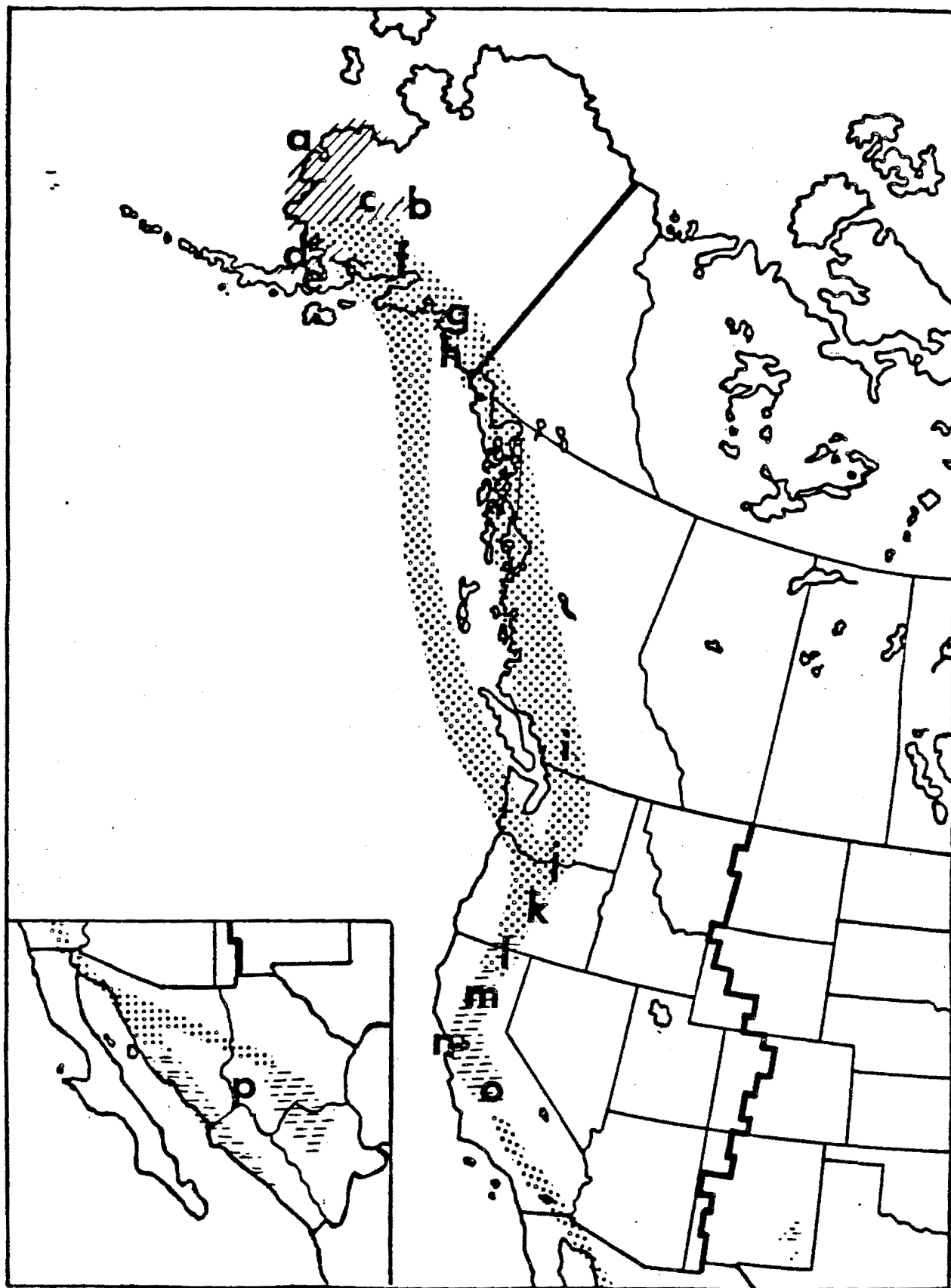


Figure 1. Pacific Flyway Population of White-fronted Geese, with Letters Referenced to Habitat Descriptions in Table 2.

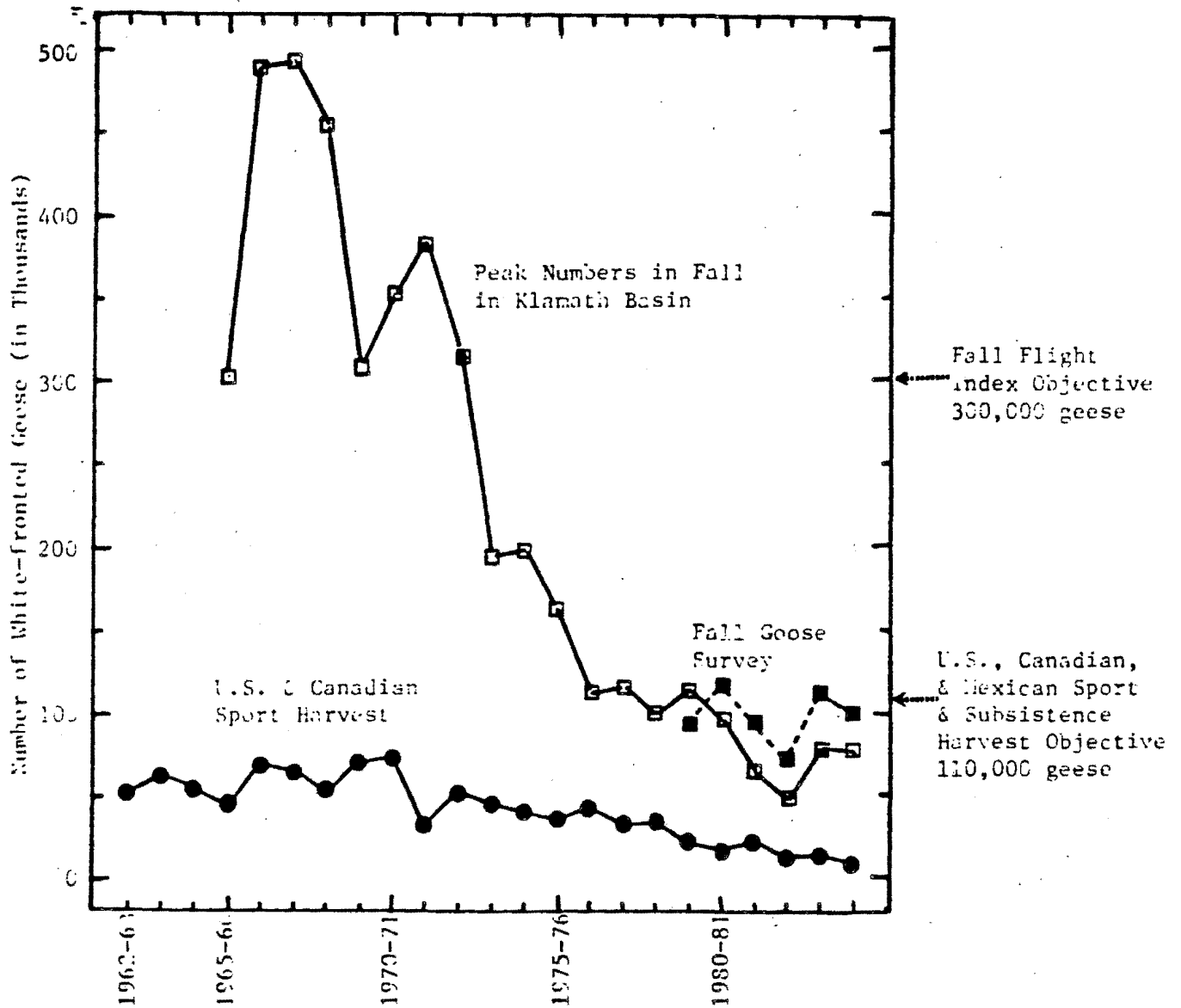


Figure 2. Numbers of White-fronted Geese as estimated by peak counts in the Klamath Basin of California and Oregon and by early November counts throughout the Pacific Flyway and numbers of geese harvested during the sport seasons.

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE WESTERN MID-CONTINENT POPULATION OF WHITE-FRONTED GEESSE

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Western Mid-Continent (WM-C) Population of White-Fronted Geese (Anser albitrons frontalis) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead region for this plan was Region 2 with support from Regions 6 and 7.

### National Objectives

While a large portion of the WM-C white-front population nests in Alaska, the population is essentially limited to the Central Flyway. Therefore, the national objectives are the same as those for the Central Flyway.

### Central Flyway Objectives

- . Maintain a WM-C white-fronted goose population of 200,000 to 300,000 birds as measured during the annual March surveys.
- . Attain geographic and temporal distribution consistent with the population objective.
- . Maximize sport harvest and non-consumptive uses consistent with the population and distribution objectives.

### Regional Objectives

FWS Region 7 (Alaska) plays an important role with the WM-C white-front population as the primary production area along with western portions of Canada. Both FWS Regions 2 and 6 host the entire population on migration and Region 2 hosts a major portion of the wintering flock. All three regions share in contributing to the total North American objective which cannot be separated with different data for each region.

### Population Distribution and Status

Distribution - WM-C white-fronts nest in central and northern Alaska and in western portions of the Canadian Arctic (Figure 1). The migration corridor includes Alberta and western Saskatchewan, extreme northeastern Montana, and the eastern tier of Central Flyway states. These white-fronts winter primarily in the Coastal Prairie of Texas and in the Highlands of Mexico.

Status - As shown in Figure 2, the WM-C population is expanding. For example, the 1980, 1982, and 1983 surveys averaged approximately 227,000, while that of 1967-1969, averaged only 81,500 (Table 1). Annual harvest has varied from an estimated low of 69,800 in 1971, to a high of 144,900 in 1980 (Table 2). Distribution of the harvest from

1969 to 1983, may be summarized as: Alaska, 1 percent; Canada, 43 percent, Central Flyway States, 46 percent; Mexico, 10 percent.

### Rationale for Objectives

The population objective is currently being met and will probably be exceeded if the current trend (Figure 2) continues. As the population nears the upper limits of the objective range, more liberal harvest regulations should be "triggered." The population, harvest, and distribution objectives were established to limit continued population expansion to the levels experienced in 1981-1982, which was considered the maximum prudent level to avoid increased depredation, competition for food supplies, etc.

### Problems

While degradation and loss of habitat, primarily on breeding and wintering areas, impact this population as it does most other waterfowl, the WM-C white-fronts, along with the Eastern population, have been particularly impacted by the outbreaks of fowl cholera (*Pasturella multocida*) during the spring staging periods in the Rainwater Basin of Nebraska. The potential magnitude of losses is illustrated by records of 23,000 carcasses of white-fronts picked up and incinerated during the spring staging periods of 1975 to 1982. Actual losses were estimated to be two to four times the number of carcasses picked up. Such losses in the spring result in broken pair bonds and reduced reproduction among the surviving breeders.

Population and harvest estimates lack the precision needed for management of a resource susceptible to either catastrophic losses from disease, or to possible overpopulation under favorable conditions and conservative harvest regulations.

### Strategies

The following list of strategies for management of the WM-C white-fronted goose population is in priority for FWS regions. The scale of 1, 2, and 3 represents high, medium, and low levels.

#### REGIONAL PRIORITIES

R2	R6	R7	R8	R9
----	----	----	----	----

#### I. Protect Key Habitats for WM-C White-Fronts

- A. Develop cooperative agreements with private landowners, Native American interests, and governmental agencies responsible for land and resource management to protect the resource and assure that all groups are aware of the concerns and responsibilities of each other.

-	-	1	-	1
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- B. Protect key habitat within the Rainwater Basin through purchase and/or long-term easement.

-	1	-	-	1
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July 1985

**REGIONAL PRIORITIES**  
**R2 R6 R7 R8 R9**

C. In cooperation with state and private interests, identify suitable tracts for lease, easement, or acquisition within the Texas coastal wintering area of WM-C white-fronts.	1	-	-	-	-
D. Discourage activities, such as reindeer herding on public lands essential to white-fronted goose nesting. Assure the necessary environmental controls during oil and gas development within nesting habitat.	-	-	1	-	2
II. Reduce non-hunting mortality of WM-C white-fronted geese.					
A. Continue sanitation measures during cholera outbreaks until research proves or disproves this to be an effective management control. Direct a more intensive research effort toward this important waterfowl disease which impacts all waterfowl.	-	1	-	1	-
B. Apply non-toxic shot requirements in major hunting areas where Service criteria are met.	1	1	1	-	1
III. Improve techniques for population and harvest estimation.					
A. Continue with the coordinated spring Mid-Continent white-fronted goose survey, mid-December goose survey, and mid-winter waterfowl survey as the current best methods of monitoring the population.	1	1	-	-	1
B. Develop comparable harvest survey procedures for the U.S. and Canada. Coordinate with Mexico for development of waterfowl and crane harvest surveys.	-	-	-	1	1

**Implementation**

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRPs) developed by regions covering portions of the Western Mid-Continent white-fronted goose range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

July 1985

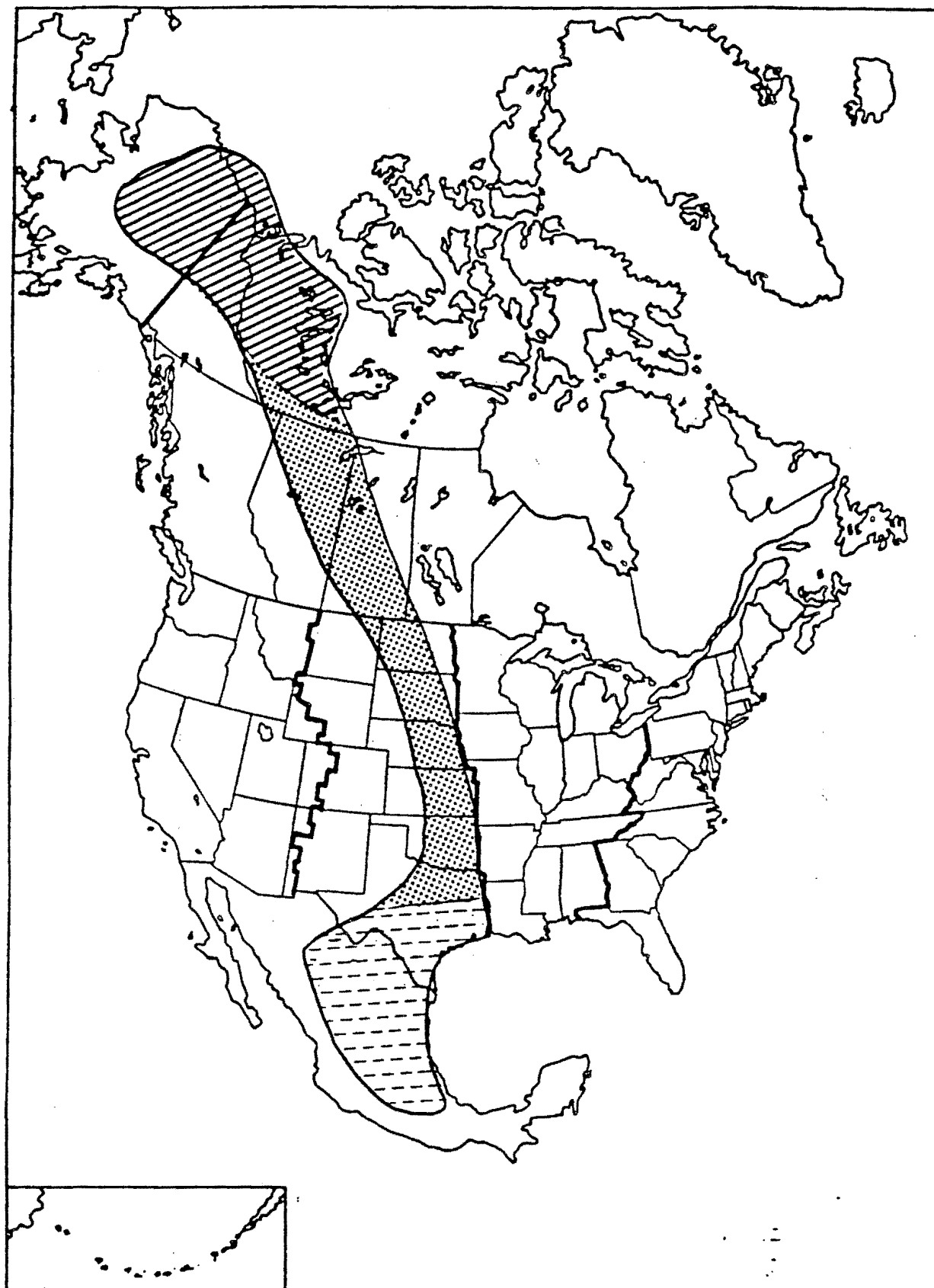
Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 2, 6, and 7, and the WM-C White-fronted Goose Management Plan produced by the Central Flyway Council.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240 (202/254-3207).

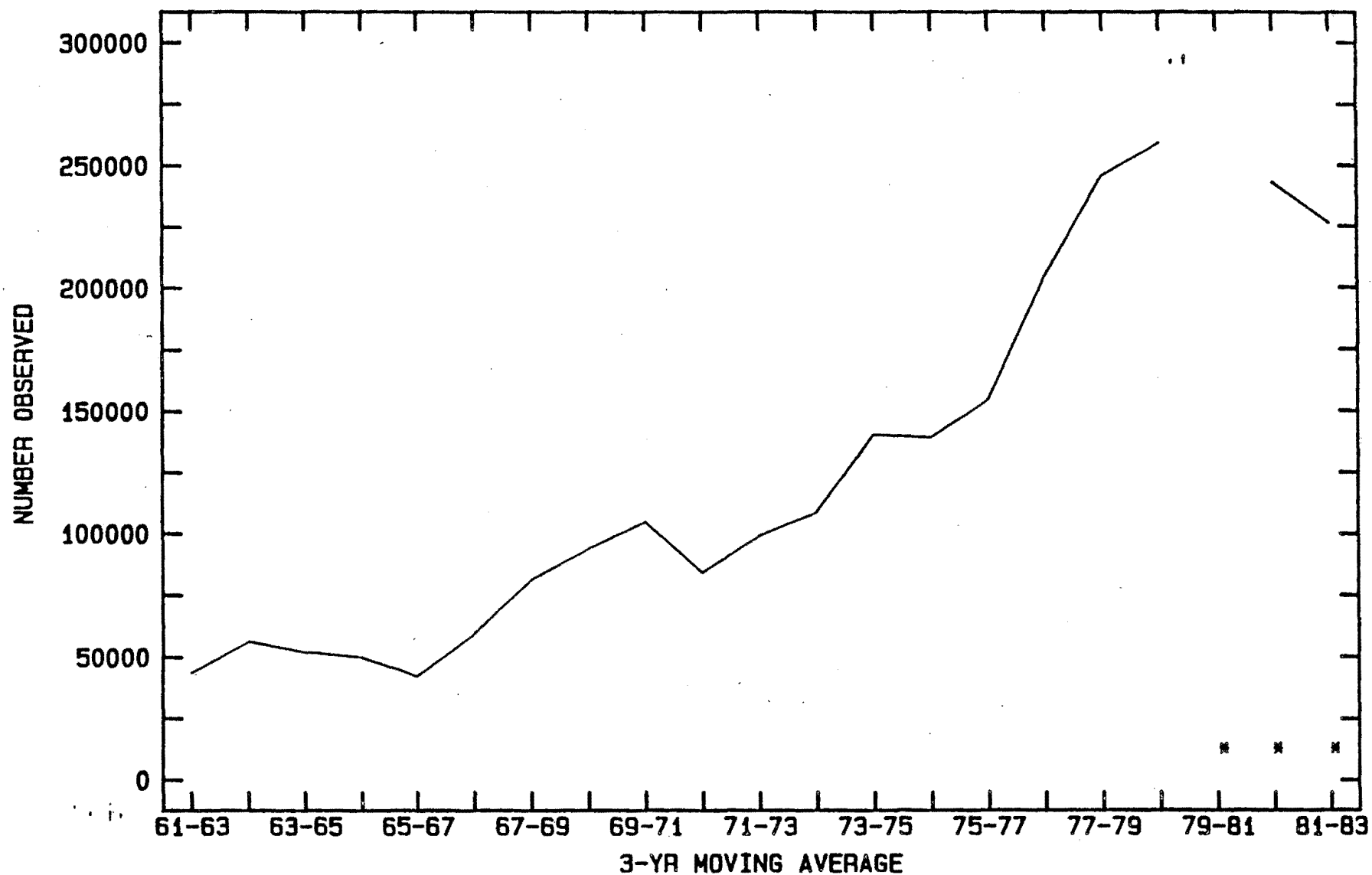
Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.



-  BREEDING
-  WINTERING
-  MIGRATION

Figure 1. Breeding, migration, and winter distribution of WMC white-fronted geese.

FIGURE 2. POPULATION TRENDS OF WM-C WHITE-FRONTED GEESE \*\*



\* 1981 SURVEY INCOMPLETE; AVERAGES DERIVED FROM  
MOST RECENT COMPLETE SURVEY DATA

\*\* 3-YR MOVING AVERAGE; COORDINATED SPRING SURVEY DATA

Table 1. Estimated Mid-Continent White-fronted Goose Populations Observed During the Spring Mid-Continent White-fronted Goose Surveys.

Survey Year	WM-C Population Index (a)	3-year Moving (b) Average
1961	33,600	—
1962	56,500	—
1963	41,900	44,000
1964	71,600	56,700
1965	43,100	52,200
1966	35,700	50,100
1967	47,700	42,200
1968	95,800	59,700
1969	101,100	81,500
1970	85,400	94,100
1971	128,500	105,100
1972	38,600	84,200
1973	131,000	99,400
1974	157,500	109,000
1975	133,200	140,600
1976	127,000	139,200
1977	204,200	154,800
1978	283,600	204,900
1979	250,600	246,100
1980	245,000	259,700
1981	71,400 (c)	—
1982	233,900	243,200 (d)
1983	201,300	226,700 (d)

- (a) Estimated Mid-Continent white-fronted goose population minus the mid-December white-front estimates in the Mississippi Flyway.  
 (b) Average of the three most recent surveys.  
 (c) Incomplete survey.  
 (d) Average of most recent complete surveys.

Source: U.S. Fish and Wildlife Service files.

Table 2. Estimated Harvests of Western Mid-Continent White-fronted Geese.

Year	Alaska (a)	Alberta and SW (Zone 1) Saskatchewan (b)	States in Central Flyway (c)	Mexico (d)	Total	3-Year Moving Average
1969	1,000	33,000	30,000	7,000	71,000	—
1970	1,000	40,000	26,700	10,000	77,700	—
1971	2,300	29,500	32,000	6,000	69,800	72,833
1972	600	44,100	38,400	8,000	91,100	79,533
1973	600	47,600	46,000	11,000	105,200	88,700
1974	300	39,000	32,700	9,000	81,000	92,433
1975	1,000	50,700	45,400	12,000	109,100	98,433
1976	1,000	46,600	32,000	13,000	92,600	94,233
1977	1,000	50,700	44,100	10,000	105,800	102,500
1978	900	47,000	43,700	13,000	104,600	101,000
1979	500	43,900	52,700	12,000	109,100	106,500
1980	300	57,500	73,100	14,000	144,900	119,533
1981	100	39,000	78,300	9,000	126,400	126,800
1982	500	36,200	62,600	10,000	109,300	126,867
1983	500	41,100	49,300	12,000	102,900	112,867
Average	773	43,060	45,800	10,400	100,033	
% Total						
Average						
Population	1%	43%	46%	10%	100%	

(a) Assume that 80 percent of state harvest of white-fronts is WM-C geese.

(b) From CWS.

#### Progress Notes

(c) North Dakota not included.

(d) Indirect recoveries of marked birds indicated that harvest in Mexico approximates 25 percent of harvests in all of Saskatchewan.

Source: U.S. Fish & Wildlife Files

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE TULE WHITE-FRONTED GOOSE

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Tule White-Fronted Goose (Anser albifrons gambelli) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead Office or Region for this plan is Region 7 with support from Region 1.

### National Objectives

The breeding, migration, and wintering distribution of these white-fronted geese are primarily limited to the Pacific Flyway with only a few band recoveries from the Central Flyway. Insufficient data exist on the small number of birds utilizing the Central Flyway to separate population objectives between the Central and Pacific Flyways (see Pacific Flyway Objectives).

### Pacific Flyway Objectives

- . To achieve an annual fall flight of 5,000 or more birds.
- . To expand the wintering distribution to the Suisun and Napa River marshes and suitable areas in the San Joaquin Valley of California.
- . To maintain habitats of sufficient quantities and qualities to meet population and distribution objectives.
- . To provide for limited sport hunting, educational and scientific uses and limited observational uses.

### FWS Regional Objectives

Because Tule geese occur in significant numbers only in Regions 1 and 7, insufficient data exist to establish population objectives for other regions.

- . To support migrating and wintering populations of at least 5,000 birds in Region 1.
- . To support a fall migrating population of at least 5,000 birds and a spring breeding population capable of producing that fall flight in Region 7.

### Population Distribution and Status

Distribution - Tule geese are a large, dark-colored white-fronted goose that was first described from a type specimen in Texas over a century ago. This species has the most limited distribution of all North American Goose species, excepting only the Aleutian Canada goose. They have long been recognized as being a small but unique group of geese wintering in the Sacramento Valley of California. However, it was not

until 1980 that the west shore of Cook Inlet, Alaska, was verified as being a major nesting area for these birds. Only about half of the estimated post-season population can be accounted for by geese within the Cook Inlet region, indicating that either surveys do not account for all geese within Cook Inlet or that birds occur elsewhere in Alaska. From nesting areas in Cook Inlet, most geese migrate along the Alaska coast through Puget Sound to the Klamath Basin and the Sacramento Valley (Figure 1). A small but unknown number may move eastward by an unknown route to the Central Flyway; recent observations of color-marked Tule geese in Kansas and Texas support the century old identification of Tule geese in that region (Figure 1).

Status - Excepting Aleutian Canada geese, this species has the smallest population of all North American geese. The 1981-82 post-season population of Tule geese was estimated to be in excess of 4,000 birds. They have increased from earlier years and appear to be increasing now, possibly because of measures to reduce harvest of all white-fronted geese in the Pacific Flyway.

#### Rationale for Objectives

The objective statements for Tule white-fronted geese presented in this plan are designed to expand the number of birds wintering in States south of Alaska, while increasing the number nesting in Alaska.

#### Problems

Habitat Destruction and Disturbance in Alaska - The most significant problems concerning Tule geese are the disturbance of geese and loss of habitat that results from rapidly increased human activity in the Cook Inlet Basin, the potential for excessive harvest, and the still fragmentary life history information on which to base management decisions.

The Cook Inlet region is the most rapidly developing region of Alaska and already supports more than half of the State's human population. The inlet is the site of Alaska's largest producing natural gas field and the second largest producing oil field. Substantial potential exists for the development of onshore oil and gas within nesting, brood rearing, and staging areas used by Tule geese. Other ongoing or planned activities include farming, coal and gold mining, construction of new roads, timber harvest, hydroelectric projects, conversion of State lands to private ownership, construction of pipelines and oil and gas loading facilities, increasing air traffic, and recreational activity. All of these developments and activities pose threats of disturbance, loss of habitat, or pollution. The Susitna Flats receive substantial protection through their status as a State Game Refuge. Attempts to provide similar legislative protection for the more critical area of Redoubt Bay have been unsuccessful.

Loss of Wetlands in California - Reductions in water supply and associated loss of wetland and riparian habitats are major problems which are adversely affecting migratory bird populations throughout the interior basin of California. With agricultural, municipal, industrial, recreational and Indian interests all competing for the limited supplies of water in the basin, wildlife habitats have been deteriorating at an increasing rate. The limited wintering areas of Tule geese in California are heavily used by recreational hunters. Consequently, the small size of the population makes this

July 1985

subspecies particularly vulnerable to excessive harvesting. At the present time, however, the severe restrictions on harvest of white-fronted geese in the Pacific Flyway also provide substantial protection for Tule geese. Additional problems facing Tule geese on wintering grounds include avian diseases and lead poisoning.

**Lack of Life History Information** - Information on populations, migration patterns, nesting areas, reproductive biology, and habitat requirements (particularly for nesting) is limited. Such information will be critical to effective regulation of harvest and to determining the most effective means for avoiding or mitigating the adverse effect of increasing human activity in nesting areas.

### Strategies

The following list of Tule white-fronted goose population management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represent high, medium, and low priorities, respectively.

		<u>REGIONAL PRIORITIES</u>	
		<u>R1</u>	<u>R7</u>
I.	Protect Breeding Habitat		
	A. Participate in the planning, permitting, and operational monitoring phases of economic resource developments occurring in Cook Inlet that may impact Tule geese.	-	1
	B. Support state agencies in their efforts to protect nesting areas in the Cook Inlet Basin, including the establishment of refuge status for Redoubt Bay.	-	1
II.	Protect Wintering Habitat		
	A. Maintain adequate habitat to support the wintering population at the objective level.	1	-
	B. Reduce habitat loss on private land.	1	-
	C. Maintain adequate migration habitat to support fall and spring populations at objective levels.	1	2
III.	Reduce Mortality and Increase Recruitment		
	A.Reduce average annual waterfowl disease losses.	1	3

July 1985

		<u>REGIONAL PRIORITIES</u>	
		<u>R1</u>	<u>R7</u>
B.	Minimize lead poisoning in waterfowl by respecting lead poisoning criteria developed and approved by the Flyway Councils.	1	2
C.	Minimize disturbances on critical staging and nesting areas during critical periods.	1	2
D.	Encourage states and private groups to restrict sport harvest of this species.	1	3
IV. Increase Distribution of Nesting and Wintering Geese			
A.	Encourage the establishment of additional breeding areas in Cook Inlet.	-	1
B.	Encourage the establishment of new wintering grounds in the Suisun and Napa River marshes and suitable areas in the San Joaquin Valley.	1	-

#### Implementation

The objectives and strategies presented in this plan were derived from the Regional Resource Plans (RRPs) developed by each of the seven regions of the U. S. Fish and Wildlife Service. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expediently as funding and manpower permit, with high priority strategies being the first to be funded and implemented.

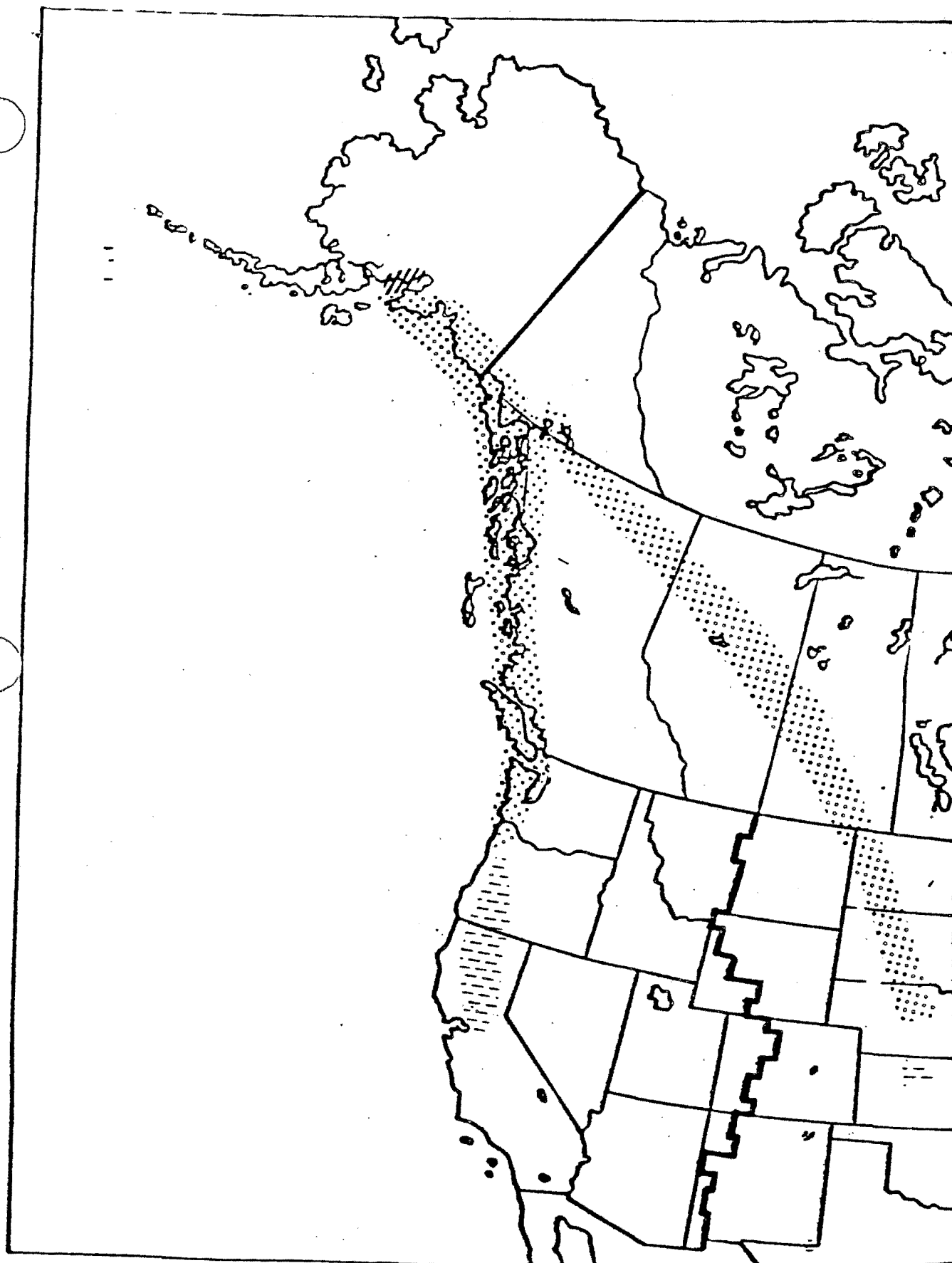
#### Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Regions 1 and 7 and the Tule White-fronted Goose Management Plan for the Pacific Flyway.

#### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.



 BREEDING  
 WINTERING  
 MIGRATION

Figure 1. Breeding, Wintering and Migration areas of Tule white-fronted geese

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE WRANGEL ISLAND POPULATION OF LESSER SNOW GESE

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Wrangel Island Population (WIP) of Lesser Snow Geese (Chen c. caerulescens). They were developed through the Regional Resource planning process and a prior cooperative effort including the U.S. Fish and Wildlife Service, U.S.S.R., Canadian Wildlife Service, and states and provinces in the Pacific Flyway. Lead Region is Region 1 with support from Region 7.

### International/National/Flyway/Regional Objectives

1. Maintain a spring population of Lesser Snow Geese on Wrangel Island of no less than 120,000 adult birds (2+ years of age).
2. Encourage the establishment of new breeding colonies on Wrangel Island, the mainland of Siberia, and Alaska within the historical breeding range of the Lesser Snow geese in these regions.
3. Maintain the quantity and quality of habitat (including protection from disturbance) necessary to accommodate up to 200,000 Lesser Snow Geese in migration to and from Wrangel Island.
4. Maintain wintering habitat where Lesser Snow geese are found in California and Oregon that is capable of supporting one million geese, of which at least 150,000 should be Wrangel Island Lesser Snow Geese.
5. Manage the Skagit-Fraser population so that it does not fall below 20,000 based on a 3-year average of mid-winter waterfowl surveys.

### Population Distribution and Status

Distribution - Lesser Snow Geese wintering in the Pacific Flyway are comprised of birds from the (WIP) and the Western Canadian Arctic Population (WCAP). WIP Lesser Snow Geese separate into two wintering subpopulations: the Skagit Fraser segment and a contingent that merges with WCAP Lesser Snow Geese to form the Oregon-California aggregate (Figure 1). The separation in the fall migration occurs at the Yukon-Kuskokwim Delta. Nearly all of the Lesser Snow Geese breeding in Siberia presently nest on Wrangel Island.

Status - Breeding population indices over 11 years (1970-1980) ranged from 120,000 in 1970 to a low of 44,000 in 1976. Figure 2 presents estimates of the wintering populations of white geese. However, these estimates include the Western Canadian Arctic Lesser Snow Goose and Ross' Goose populations which complicates the determination of population numbers in winter surveys. The size of the Skagit Bay, Washington flock

July 1985

(21,000) has short-term variability but appears stable over the long term (Figure 2). The Oregon-California aggregate declined from 118,000 in 1970 to 31,000 in 1977.

There is a minor but biologically significant exchange between WCAP and WIP Lesser Snow Geese amounting to approximately 5 percent of the population annually, mostly males.

The only area in the Pacific Flyway where Wrangel Island Lesser Snow Goose population harvest can be measured relatively exclusive of Western Arctic birds is on the estuaries of Washington. The twenty year (1962-1981) average annual harvest is 3,100 birds (Figure 3). The annual high harvest was 16,000 birds in 1981. The lowest annual harvest cannot be accurately measured because of sample bias inherent in the low reporting rates.

#### Rationale for Objectives

The objective statements for WIP Lesser Snow Geese presented in this plan are designed to maintain a breeding population large enough to provide sport hunting, while expanding the breeding distribution to its historic range.

#### Problems

Information Needs - The distribution of Wrangel Island Lesser Snow Geese is not thoroughly understood. Extensive color marking and banding is needed to ascertain migration and winter distributions and to distinguish various populations of Lesser Snow geese in the Oregon-California aggregate.

There is presently an inadequate exchange of data between U.S.S.R., Canada, and the U.S. There is a need to exchange translated papers and reports.

Winter Habitat - Developments and human disturbances are increasing on the river deltas along their migration routes and on the wintering areas. A threat of oil pollution exists throughout the coastal migration range. The potential consequences of the Spartina sp. invasion of wintering areas on Washington estuaries are being investigated.

Disease - Another important problem is mortality due to avian cholera and lead poisoning. This is compounded by habitat loss which concentrates the birds.

#### Strategies

The following list of WIP Lesser Snow Goose management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium, and low priorities respectively.

July 1985

		REGIONAL PRIORITIES				
		R1	R6	R7	R8	R9
I.	Maintain and Enhance Breeding Habitat					
	A. Encourage establishment of new colonies on Wrangel Island, the mainland of Siberia, and in Alaska within the historic breeding range of snow geese.	-	-	2	-	2
	B. Reduce predation by arctic fox on breeding grounds.	2	-	2	-	2
II.	Maintain Staging and Wintering Habitat					
	A. Halt the expansion of <u>Spartina</u> sp. which threatens to reduce the carrying capacity of the Skagit coastal area.	1	-	-	1	-
	B. Monitor habitat changes that may occur as important migration stops change from public to private ownership.	2	3	1	-	1
	C. Increase carrying capacity of the Klamath Basin for snow geese as constrained by the depredation potential of the region.	1	-	-	-	-
	D. Encourage good habitat management procedures in Alaskan staging areas, especially those being transferred to private ownership on the Yukon Delta, Becharof, and Alaska Peninsula NWRs, and Bering Land Bridge National Monument.	-	-	1	-	1
	E. Reduce crop depredations in the Skagit area of Washington and Central Valley of California.	2	-	-	-	-
	F. Reduce aircraft and other human disturbance.	2	-	-	-	-
	G. Handle depredation complaints by showing landowners how to solve their own problems.	3	-	-	-	-
III.	Manage the Population Through Harvest Regulation.					
	A. Develop a history and status report on subsistence waterfowl hunting in Alaska.	-	-	1	-	1

July 1985

	REGIONAL PRIORITIES				
	R1	R6	R7	R8	R9
B. Continue harvest restrictions which will allow for a population increase to at least 120,000 adults.	2	3	2	-	2
C. Efforts should be made to shift subsistence spring harvest to late summer and early fall and/or to other species.	2	-	2	-	2
IV. Acquire Accurate Production and Population Data.					
A. Encourage the continued reporting of breeding population size and production.	1	-	1	-	1
B. Schedule and implement Snow Goose neck collaring as needed to provide migration, wintering, and breeding information.	1	-	1	-	1
C. Improve population survey methodology through photographic counts.	2	3	2	2	2
D. Continue annual age-ratio counts at staging and wintering areas.	2	3	2	-	2
E. Attempt to separate species of white geese in the fall white goose survey.	2	-	-	-	2
F. Improve communications with U.S.S.R. on population data and technical papers.	2	1	2	-	2

#### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRPs) developed by Regions covering portions of the WIP Lesser Snow Goose range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

#### Sources

This plan was derived from the U.S. Fish and Wildlife Services Regional Resource Plans for Regions 1 and 7 and the WIP Lesser Snow Goose Management Plan for the Pacific Flyway. Draft 1980.

July 1985

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

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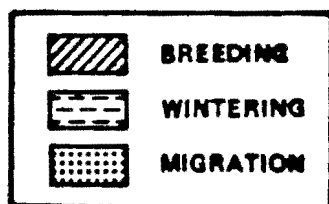
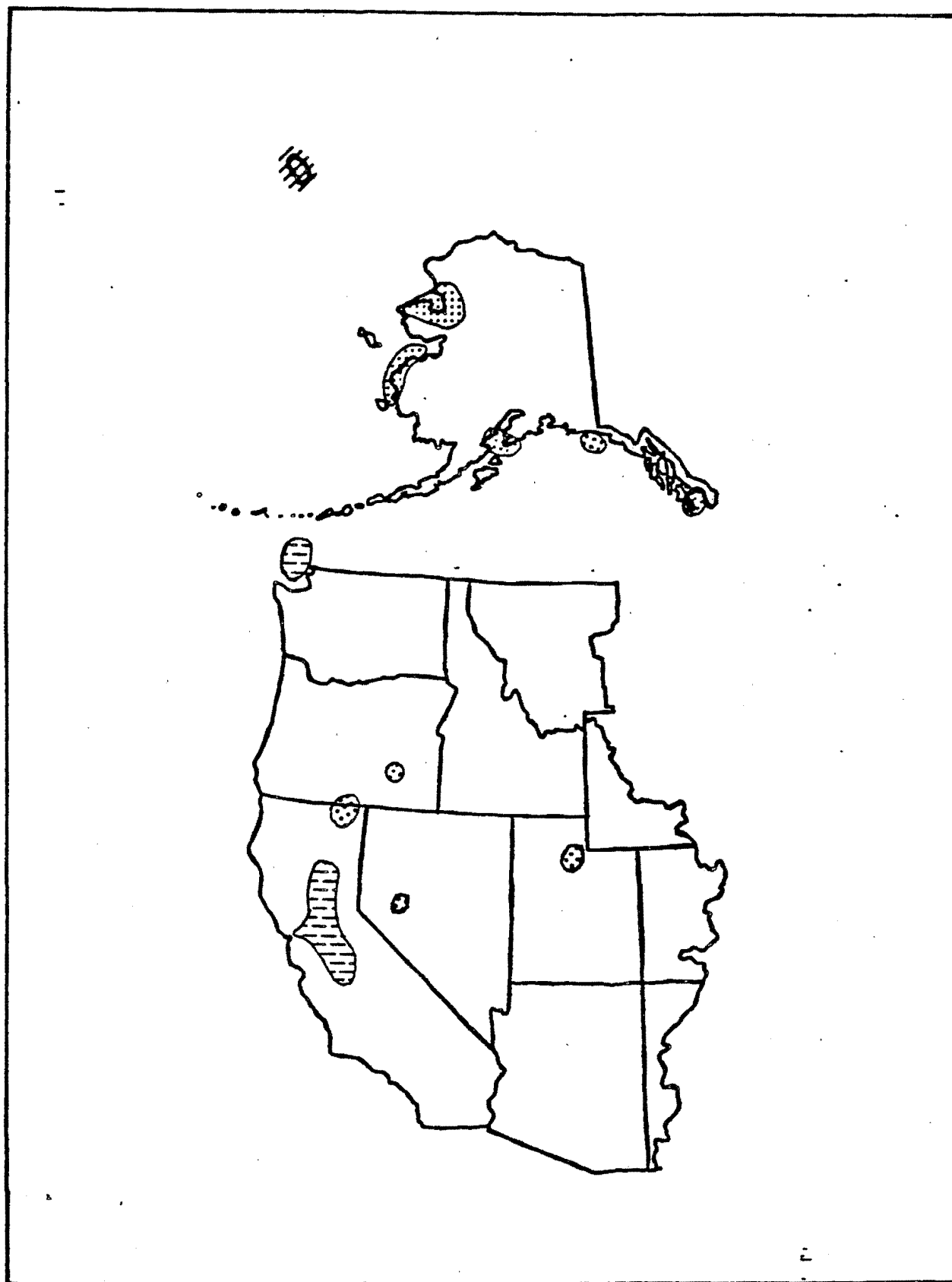


Figure 1. Breeding, Migration, and Winter Distribution of Wrangel Island Population of Lesser Snow Geese

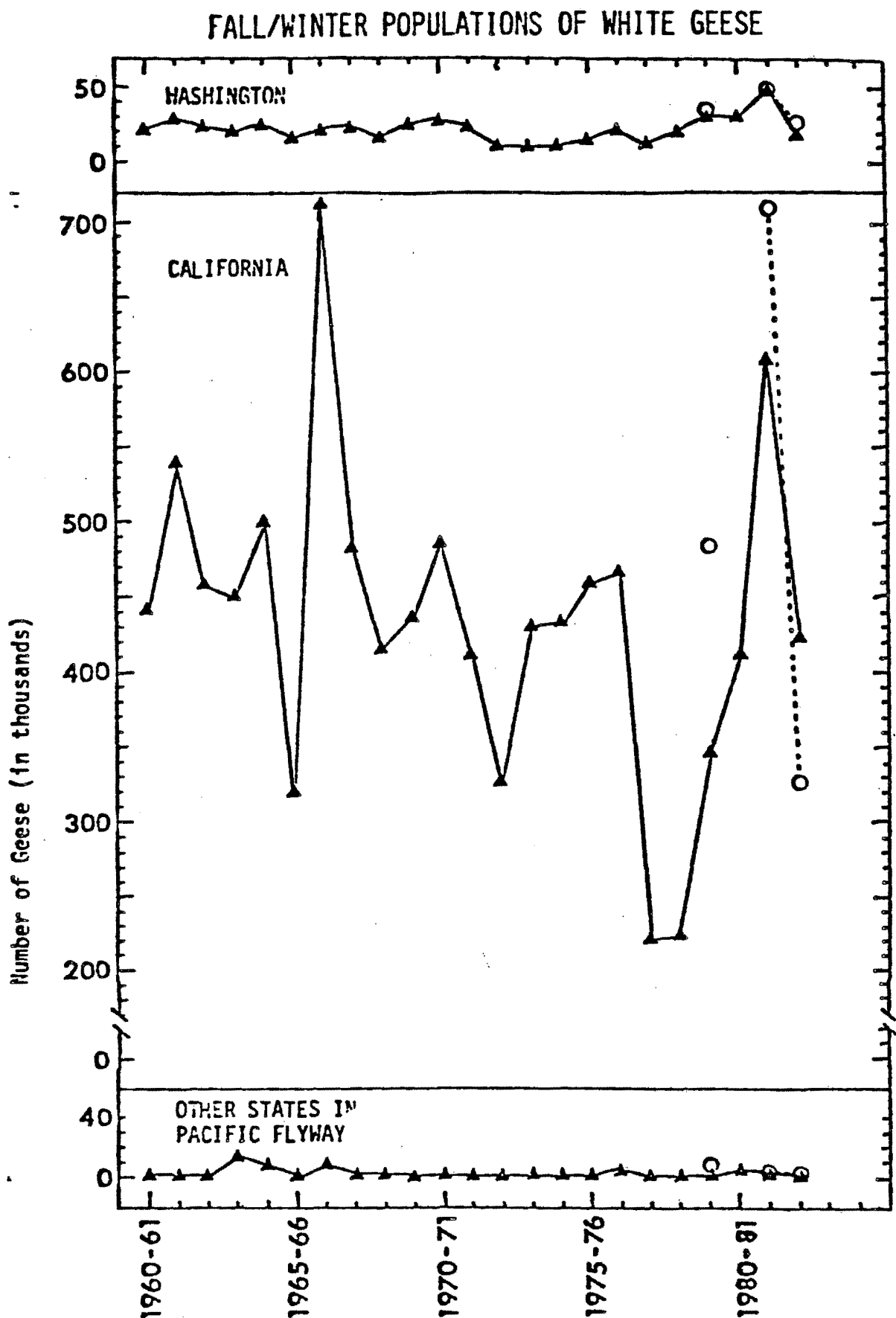


Figure 2. Estimated numbers of white geese (Lesser Snow and Ross') as measured by the Mid-winter Waterfowl Survey in the Pacific Flyway States and estimated numbers as measured by the Fall Goose Survey. (open circle and dashed line).

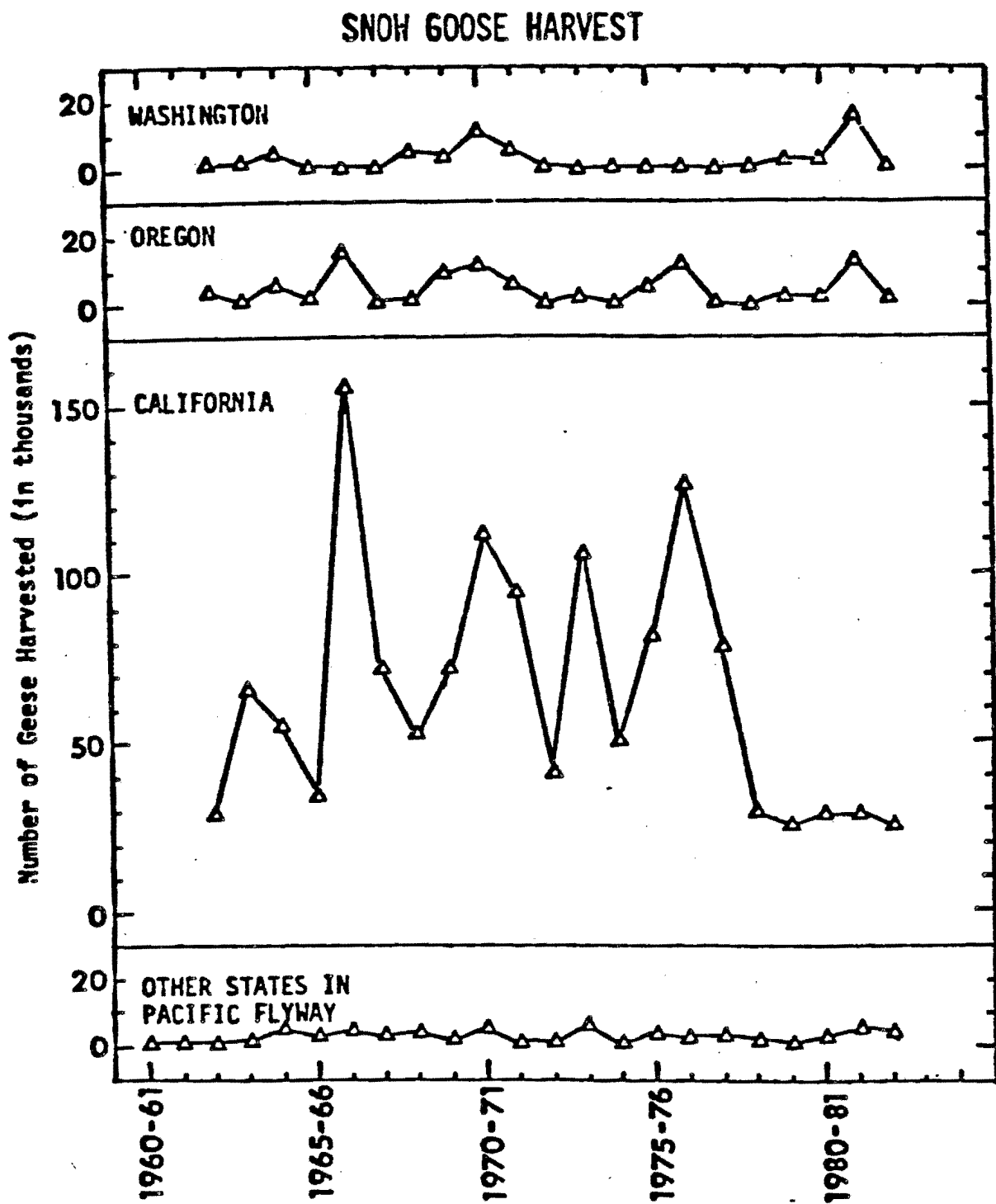


Figure 3. Estimated Harvest of Lesser Snow Geese in States of the Pacific Flyway as measured by USFWS surveys.

"Wrangel Island Snow Goose NSSE"

MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE  
WESTERN CANADIAN ARCTIC POPULATION OF LESSER SNOW GEESE

Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Western Canadian Arctic Population (WCAP) of Lesser Snow Geese (Chen c. caerulescens) that were developed through the Regional Resource Planning process and a prior cooperative planning effort, including the U.S. Fish and Wildlife Service, Canadian Wildlife Service and states and provinces of the Pacific Flyway. Lead Region for this plan is Region 1 with support from Regions 2, 6, and 7.

National Objectives

1. Maintain a population of 200,000 breeding-age birds as measured by periodic surveys of the breeding colonies.
2. Maintain existing distribution without knowingly or purposefully taking actions which would alter the temporal and geographic distribution from that shown in Figure 1.
3. Assure adequate habitat to meet population and distribution objectives.
4. Manage for harvest rates not to exceed a 4-year moving average of 25 percent of the fall flight as indicated by the harvest survey.
5. Encourage non-consumptive uses that do not affect population objectives.

Pacific Flyway Objectives

1. Maintain a population of 200,000 breeding age birds as measured by periodic surveys of the breeding colonies.
2. Maintain a fall flight of 420,000 "white geese" as measured by the December White Goose survey.
3. Manage for harvest rates not to exceed a 4-year moving average of 25 percent of the fall flight.

Regional Objectives

WCAP Lesser Snow Geese are found in Regions 1, 2, 6, and 7. It is not possible to partition the populations of Lesser Snow Geese among USFWS regions. There is evidence that the WCAP Lesser Snow Geese are shifting to wintering areas in the Western Central Flyway, where the white geese have increased four-fold between 1972 and 1981.

### Population Distribution and Status

**Distribution** - The Western Canadian Arctic population of Lesser Snow Geese breed west of 100 degrees longitude in Arctic North America, primarily in the Egg River Colony on Banks Island (Figure 1). It winters mainly in New Mexico, California, and northern Mexico. Important staging areas are in Canada, Montana, southeastern Colorado, southern Oregon, and northeast California.

**Status** - Arctic-nesting geese are subject to the vagaries of weather and their production for successive years may be adversely affected by it. Figure 2 presents estimates of the wintering populations of white geese. However, these estimates include another snow goose population (Wrangel Island) and the Ross' goose population which complicates determination of population numbers in winter surveys.

There is no information on year-to-year breeding populations. Current estimates indicate that during the past 20 years Western Arctic colonies ranged from 100,000 to 200,000 breeding adults.

WCAP and Wrangle Island Population Lesser Snow Geese and Ross' Geese winter in many of the same locations complicating determination of population numbers from conventional winter surveys. There is growing evidence that an increasing percentage of WCAP Lesser Snow Geese are wintering in the Central Flyway.

The average annual Lesser Snow Goose harvest for the 20-year period from 1962 through 1981 for the Pacific Flyway is 78,000 birds. The Flyway's highest annual harvest was 177,000 birds in 1966 and the lowest 31,000 in 1978 (Figure 3). These figures include the Wrangel Island population.

### Rationale for Objectives

The objective statements for WCAP Lesser Snow Geese presented in the plan are designed to sustain a 25 percent harvest, while maintaining the present distribution.

### Problems

**Survey Inadequacies** - Current winter population estimates of white geese do not differentiate the Ross' Goose from the Lesser Snow. A color marking program and additional surveys are needed to determine the relative proportion of Wrangel Island versus Western Arctic Lesser Snow Geese in the Pacific Flyway, as well as, the proportions of WCAP versus Central Arctic Population Lesser Snow Geese in the Central Flyway. Also, better communication is needed between biologists representing the U.S.S.R., Mexico, Canada, and the United States.

**Winter Habitat** - The staging and wintering areas of these Lesser Snow Geese need protection from encroaching development and human disturbance. The Central Valley has lost 90 percent of its historic wetlands and this loss is continuing, despite acquisition and easement programs.

**Disease** - Disease losses in wintering Lesser Snow Geese, primarily from cholera, have been severe and losses to this disease on the breeding grounds have been documented.

Strategies

The following list of WCAP Lesser Snow Goose management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium, and low priorities, respectively.

		<u>REGIONAL PRIORITIES</u>					
		<u>R1</u>	<u>R2</u>	<u>R6</u>	<u>R7</u>	<u>R8</u>	<u>R9</u>
I.	Protect and Maintain Breeding Habitat						
	A. Conduct photo census of breeding grounds and habitat conditions every 3 years.	-	-	-	-	-	1
	B. Establish cooperative agreement with natives for habitat protection.	-	-	-	1	-	1
	C. Support establishment of a wildlife park to protect north slope staging area.	-	-	-	1	-	1
II.	Protect and Enhance Wintering Habitat.						
	A. Manage wintering areas to improve distribution and minimize depredations.	1	2	-	-	-	1
	B. Promote agricultural practices and incentive programs that will provide goose feeding areas.	1	2	-	-	-	1
	C. Determine if changes in habitat on Mexican wintering grounds are affecting wintering populations.	2	-	-	-	-	2
	D. Ensure adequate habitat is available in staging areas.	1	2	2	2	-	2
III.	Obtain Data That Will Facilitate Population Management						
	A. Evaluate present population surveys and investigate new methods for obtaining more accurate results.	1	2	-	-	1	1
	B. Initiate research on management measures to minimize occurrence of avian cholera on wintering and breeding areas.	1	2	-	2	1	1

July 1985

	REGIONAL PRIORITIES					
	R1	R2	R6	R7	R8	R9
C. Physiological and nutritional studies need to be conducted to determine winter requirements.	1	2	-	3	1	1
D. Initiate surveys and color marking to determine proportions composing winter white goose populations.	1	2	-	1	-	2
E. Determine carrying capacity for spring and fall migration and feeding sites.	2	-	2	3	2	2
F. Continue attempts to determine subsistence harvest on breeding grounds.	2	-	-	1	-	2
G. Continue fall age ratio surveys to validate breeding ground production estimates and evaluate potential for distinguishing snow goose subpopulations.	2	-	2	2	-	2

### Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRP) developed by Regions covering portions of the WCAP Lesser Snow Goose range. The Regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

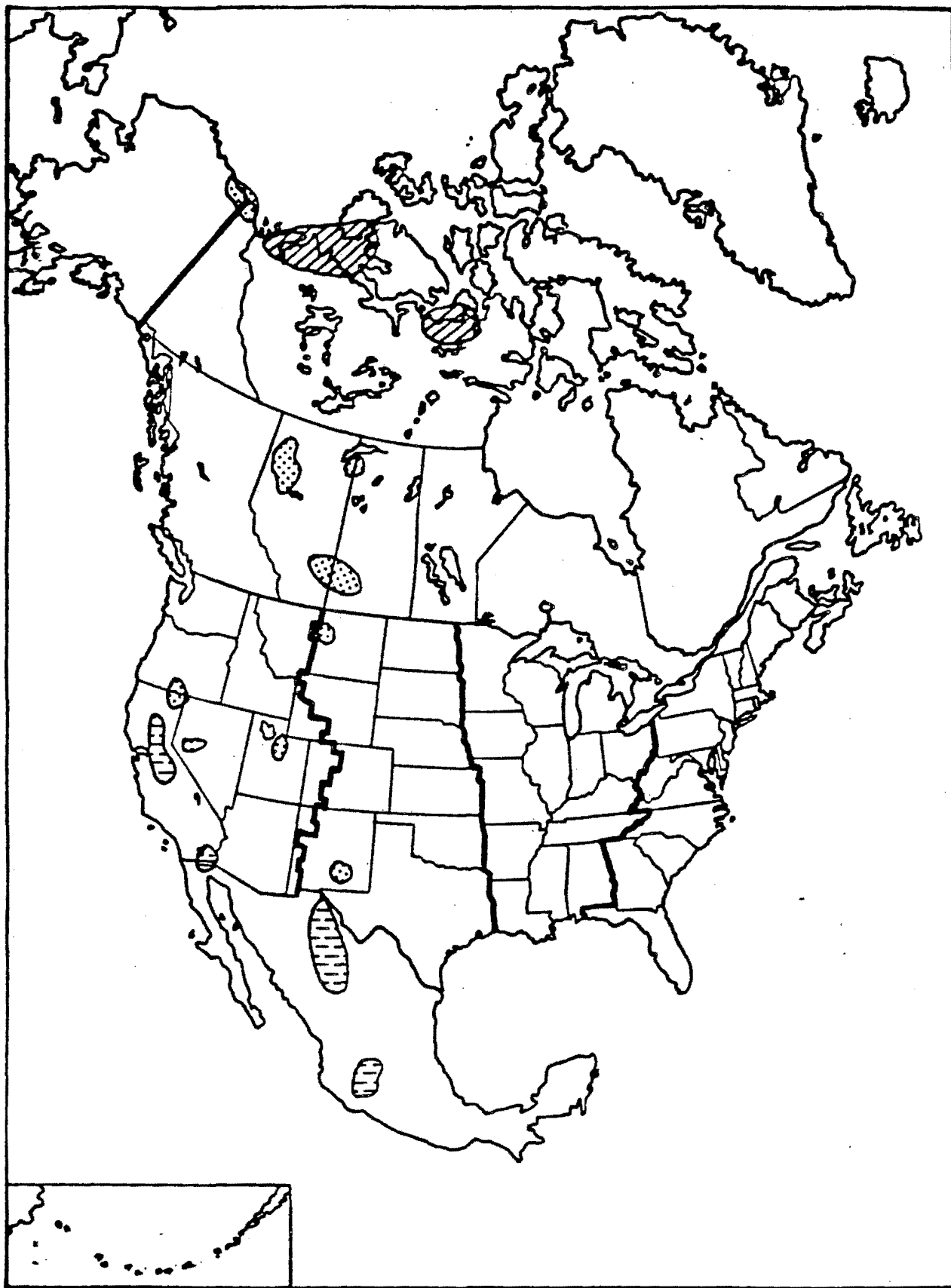
### Sources

This plan was derived from the U.S. Fish and Wildlife Services Regional Resource Plans for Regions 1 and 7 and the WCAP Lesser Snow Goose Management Plan for the Pacific Flyway, Draft, 1980.

### For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3207).

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.



 BREEDING  
 WINTERING  
 MIGRATION

Figure 1. Breeding, Migration and Winter Distribution of WCAP Lesser Snow Geese.

# FALL/WINTER POPULATIONS OF WHITE GEESE

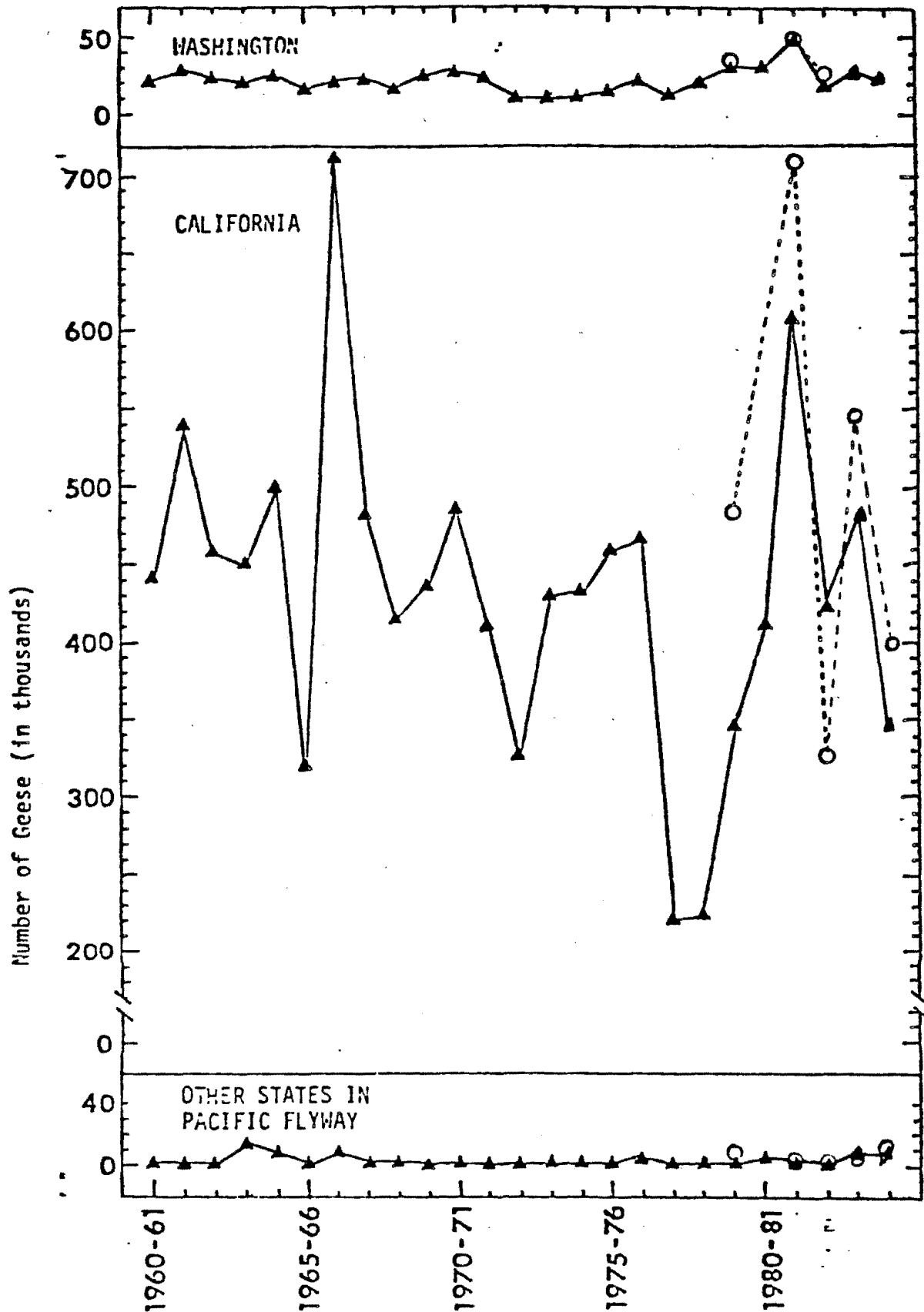


Figure 2. Estimated numbers of white geese (Lesser Snow and Ross') as measured by the Mid-winter Waterfowl Survey in the Pacific Flyway States and estimated numbers as measured by the Fall Goose Survey. (open circle and dashed-line).

"Western Canadian Arctic Lesser Snow Goose NSSR"

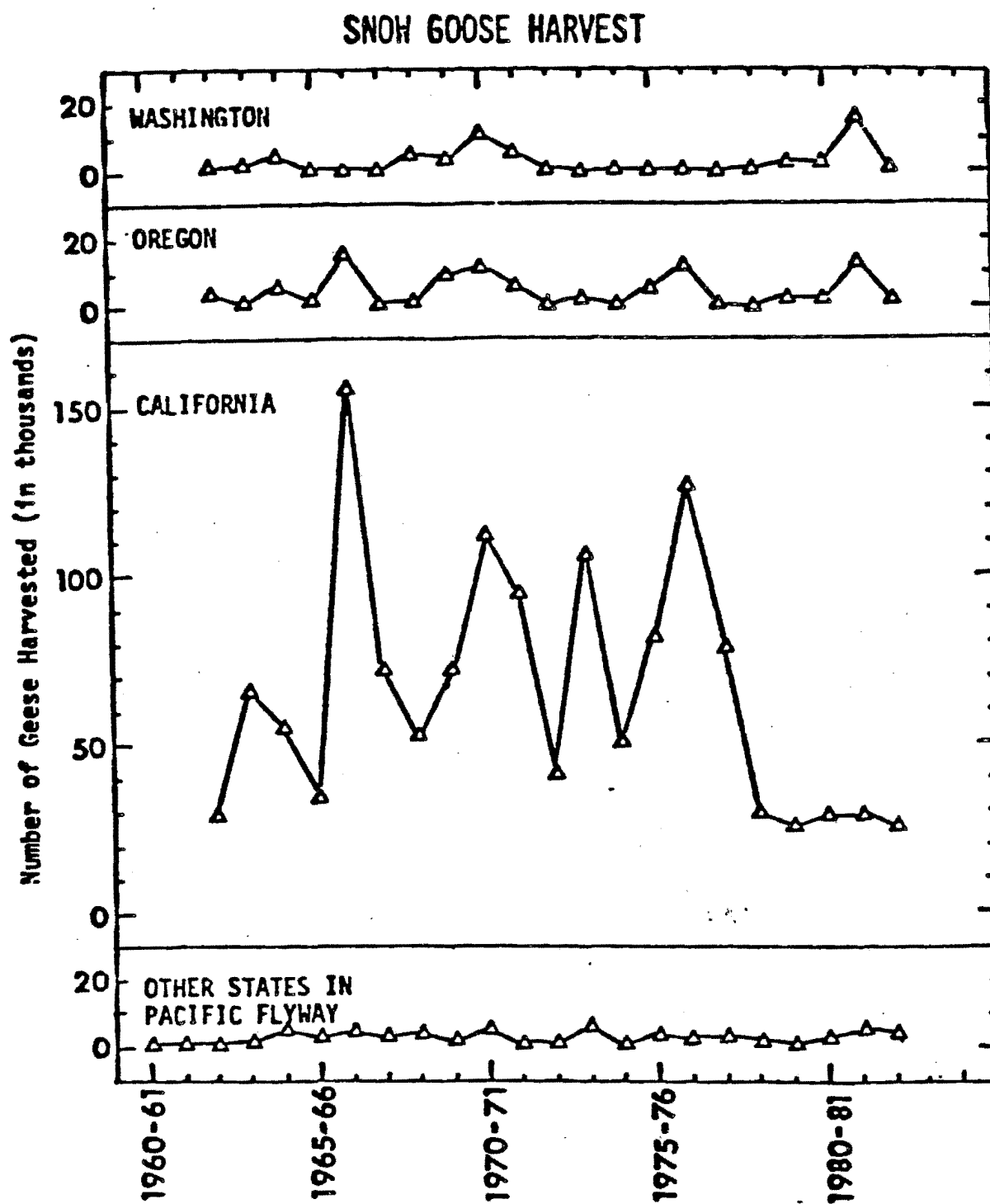


Figure 3. Estimated Harvest of Lesser Snow Geese in States of the Pacific Flyway as measured by USFWS surveys.

"Western Canadian Arctic Lesser Snow Goose NSSE"

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE SNOW AND ROSS' GOOSE OF THE WESTERN CENTRAL FLYWAY

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Snow and Ross' Goose (Chen caerulescens caerulescens and Chen rossii, respectively) of the Western Central Flyway that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service. Lead region for this plan was Region 2 with support from Region 6.

### National Objectives

Because the Western Central Flyway (WCF) Population of Snow and Ross' Geese is restricted to the Central Flyway, the national objectives for the population are the same as those for the Central Flyway.

### Central Flyway Objectives

- . Maintain a stable United States wintering population of WCF snow and Ross' geese at 1981 levels (3-year running average, mid-December survey, 1980-82 = 54,200 birds).
- . Encourage wider, more uniform geographic and temporal distribution of the WCF population.
- . Maximize recreational use of the WCF population consistent with population and distribution objectives.

### Regional Objectives

FWS Regions 2 and 6 host the entire population during migration with Region 2 maintaining a little less than half the population on wintering areas. Both regions thus share in supporting the National Objectives, making it impractical to further refine objective figures.

### Population Distribution and Status

Distribution - The snow and Ross' geese of this population breed in the Western Arctic colonies of Canada, notably on Banks Island (Figure 1). Included are some snow and Ross' geese which breed in the Central Arctic colonies around Queen Maude Gulf and some snow geese which breed on Wrangel Island, U.S.S.R. These geese stage in the fall in the agricultural region of eastern Alberta and western Saskatchewan. From there, one segment migrates southwesterly into California for the winter. The other segment, termed the Western Central Flyway (WCF) population, and the subject of this plan, migrates southward through the western tier States of the Central Flyway to wintering areas in southeastern Colorado, New Mexico, the Texas Panhandle, and the Northern Highlands of Mexico.

Status - The best population estimate of the WCF flock is the mid-December goose count. Figure 2 presents graphs of estimated population and trends for major wintering areas in the United States (NW Texas, Colorado, and New Mexico). The WCF population of snow geese has increased dramatically: the 3-year running average for 1982-1984 is more than triple that of 1972-1974 (Table 1).

Trends in the estimates of breeding adults in the Western Arctic colonies parallel the winter count information. A large portion of the WCF population winters in Mexico where accurate surveys are not scheduled annually (55-75 percent of the estimated totals in 1976, 1978, 1979, 1981, and 1983 were in Mexico). Accordingly, the annual status of the population has to be assessed primarily through trends and indices from mid-December surveys in the United States (Figure 2).

Harvests from the WCF population of light geese have been minimal as measured in the United States (see Figure 1). Harvest data in Mexico is unknown. The harvest in Alberta and southwestern Saskatchewan includes light geese that migrate to the Pacific Flyway and cannot be directly linked to the WCF population of light geese.

#### Rationale for Objectives

Objectives were established to limit continued expansion of the population (which has recently resulted in increased competition for food supplies, increased depredations, and increased incidence of disease) and to encourage better distribution of the population to increase sport harvest of the WCF flock.

#### Problems

Several problems and potential problems face the WCF population of light geese. Food supplies have been exhausted in one or more key wintering areas during some recent seasons. Avian cholera, considered to be symptomatic of stress caused by crowding, has been confirmed in one or more wintering flocks during recent winters. Depredations, although still tolerable in most cases, have been increasing and associated with more wintering flocks. Other populations of light geese showing similar growth rates have over-used and damaged the vegetation on their breeding ranges. Continued growth of the WCF population of light geese can only increase the severity of the indicated problems. Efforts to increase the harvest from the WCF population have resulted in only limited increase in the harvest. The limited hunting opportunities which can be accommodated on the few managed areas and relatively restricted private lands used by these geese precludes the necessary harvests.

#### Strategies

The following management strategies are listed in order of priority for FWS regions. The scale of 1, 2, and 3 represents high, medium, and low priority, respectively.

July 1985

REGIONAL PRIORITIES  
R2 R6 R9

I.	Monitor winter distribution of WCF snow geese by continuing mid-December goose count and establishing regular census routine for Mexico.	1	1	1
II.	Increase harvest of snow geese in the WCF white goose range to hold wintering populations to objective levels.			
	A. Promulgate appropriate harvest regulations; separate seasons and bag limits for light geese to foster snow goose hunting in all harvest areas.	2	2	1
	B. Expand existing public hunting programs insofar as is consistent with other management programs.	2	2	1
	C. Develop new public hunting programs on public lands to which access can be assured, on private lands through cooperative agreements or easements, and/or by purchase of required lands in the vicinity of existing and probable concentrations of snow geese.	2	2	-
	D. Encourage landowners to permit and sponsor hunting for snow geese.	2	2	-
	E. Promote hunting of snow geese by information and education programs.	1	1	-
III.	Attract snow geese to desired locations within their range.			
	A. Identify potential new wintering habitats - especially in New Mexico.	1	-	-
	B. Create new management areas by developing required food, water, and sanctuary.	2	-	-
IV.	Discourage undesirable concentrations of WCF snow geese.			

July 1985

REGIONAL PRIORITIES  
R2 R6 R9

- A. Adjust management programs to reduce the attractiveness of areas on which undesirable concentrations occur; e.g., by growing and/or manipulating crops so that food supplies are not readily available when geese first arrive from the north.

1 - -

- B. Encourage appropriate management of nearby private lands; e.g., early season hunting activity.

1 - -

Implementation

The objectives and strategies in this Plan are consistent with the FWS Regional Resource Plans (RRPs) developed by regions covering portions of the WCF population of snow and Ross' geese range. The regions will use the detailed operations plans contained in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Service's Region 2 and 6 Regional Resource Plans and the Management Guidelines for Snow and Ross' Geese in the Western Central Flyway adopted by the Central Flyway Council in July 1982.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240 (202) 254-3207.

Migratory bird populations are dynamic with changes in abundance, distribution, and other characteristics frequently occurring. This fact, along with changing human perspectives and needs, will require this plan to be flexible and periodically modified. Before publishing or citing the above, please ensure that the most recent information is being used by contacting the above Office.

Table 1. Mid-December, population, and harvest estimates of WCF snow and Ross' geese in the United States\* (3-year average):

	1972-74	1973-75	1974-76	1975-77	1976-78	1977-79	1978-80	1979-81	1980-82	1981-83	1982-84
Mid-December Population Estimate	18,133	21,967	27,733	29,300	31,367	30,316	32,483	35,917	54,217	61,717	65,983
Harvest Estimate	—	—	—	—	5,000	4,333	2,733	2,964	3,291	4,010	—

\* NW Texas, Colorado, New Mexico

SOURCE: U.S. Fish and Wildlife Service

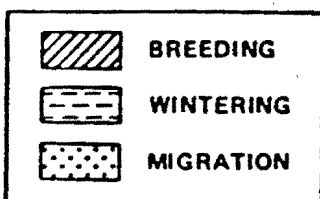
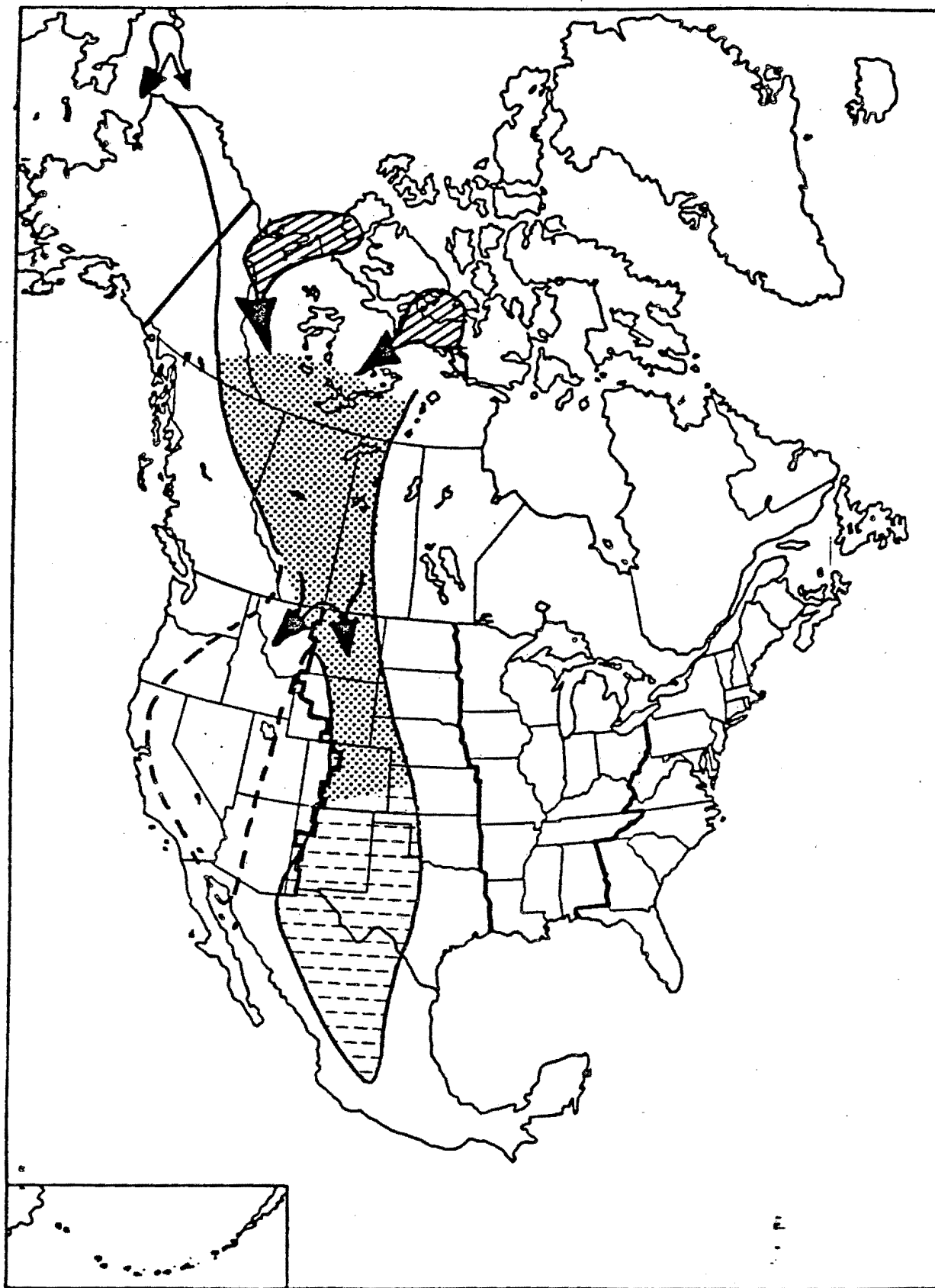
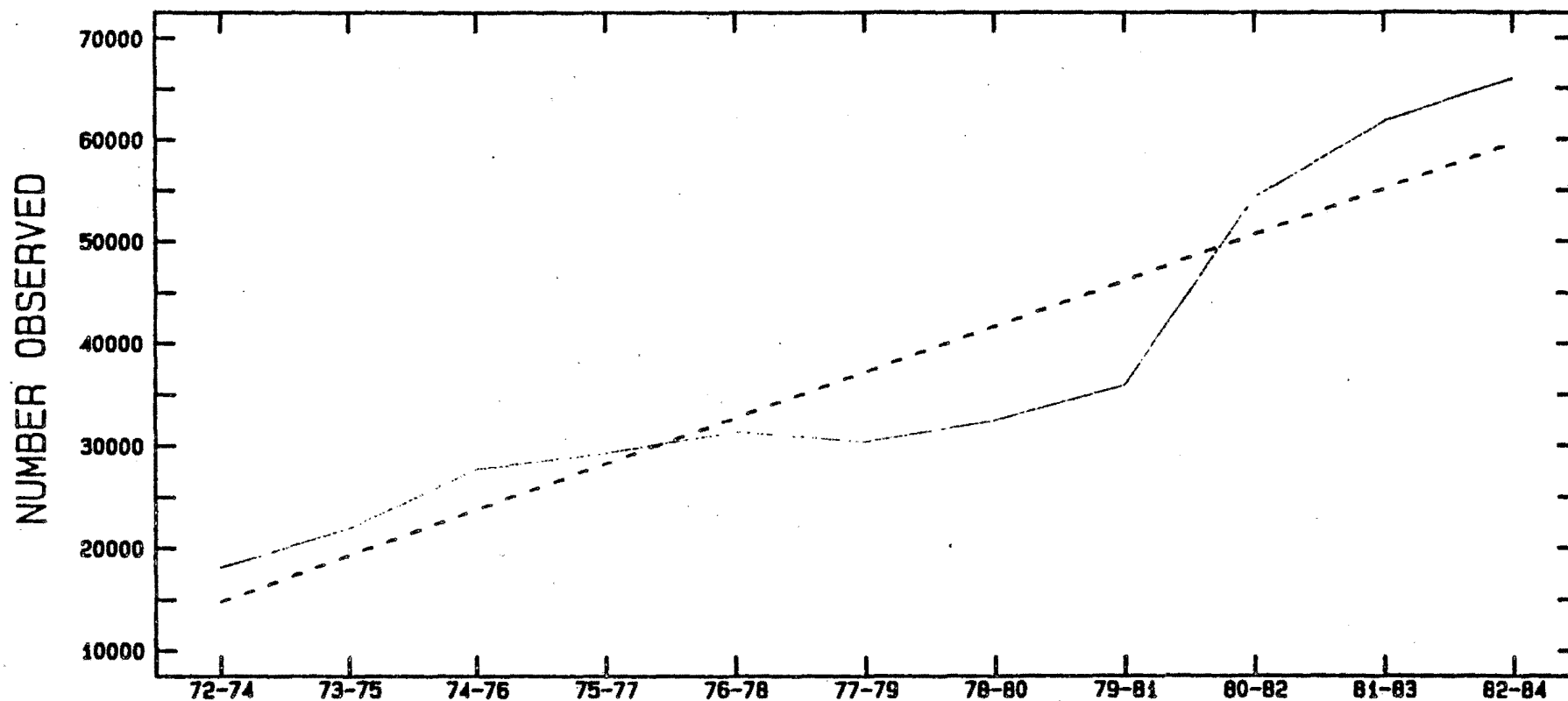


Figure 1. Breeding, Migration, and Winter Distribution of WCF Snow Geese (After Dzubin, 1979)

FIGURE 2. MID-DECEMBER POPULATION TREND  
(3-YR RUNNING AVERAGES) FOR WCF SNOW  
AND ROSS' GEESE IN THE UNITED STATES \*



\* NW TEXAS, COLORADO, NEW MEXICO

July 1985

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE PACIFIC BRANT

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of Pacific Brant (*Branta bernicla*) that were developed through the Regional Resource planning process of the U.S. Fish and Wildlife Service and which are partially derived from a prior management plan (Pacific Flyway Council 1981) that was cooperatively developed by Federal, State, and Provincial agencies in the Pacific Flyway portions of the U.S., Canada, and Mexico. Lead for this plan was the Office of Migratory Bird Management with support from Regions 1 and 7.

### National Objectives

The breeding, migration, and wintering distribution of this population of brant are limited to the Pacific Flyway (see Pacific Flyway objectives).

### Pacific Flyway Objectives

- Maintain a 3-year-average population of 185,000 brant (58,000 in California, Oregon and Washington) as measured by the January Winter Waterfowl Survey, with corresponding average breeding populations of 70,000 (53,000 in U.S.), average fall flight of 210,000 (158,000 from U.S.), and average harvest of 42,000 (23,000 in U.S.) (Table 1).

### FWS Regional Objectives

- To attain and maintain wintering distribution and numbers within Region 1 as follows:

Washington:	Samish/Padilla/Fidalgo Bays	20,000
	Dungeness Bay	1,000
	Hood Canal	500
	Other small areas in Puget Sound	500
	Willapa Bay-Grays Harbor	3,000
Oregon:	Tillamook-Netarts Bays	2,500
	Yaquina Bay	500
California:	Humboldt Bay	17,500
	Tomaes-Drakes Bays	7,500
	Morro Bay	5,000

- To accommodate brant as wintering birds in Region 7, but with no numerical objective.
- To maintain summer, migration, and winter habitats in Region 7 and migration and winter habitats in Region 1 in sufficient quantity and quality to support the objectives for population size and distribution.

- . At population objective levels, maintain a sport harvest in Region 1 of 12,000 brant and a sport-subsistence harvest in Region 7 of 11,000 brant.

#### Population Distribution and Status

Distribution - Pacific Brant are truly marine waterfowl, spending all but summers in salt and brackish waters and depend on eelgrass and wigeongrass from fall through spring and sedges in summer for most of their foods. They breed on coastal lowlands of the Bering, Chukchi, and Beaufort Seas from as far west as Wrangel Island, U.S.S.R., to as far east as Somerset Island, Northwest Territories. Alaska is a major importance to Pacific Brant with about half the nesting population being concentrated on the outer fringe of the Yukon-Kuskokwim Delta, about half of the nonbreeding brant molting near Teshekpuk Lake on the North Slope, and almost the entire population staging both in fall and spring at Izembek Lagoon on the Alaska Peninsula. More than 90 percent winter in Mexico, along the coasts of Baja and mainland; most of the remainder winter along the coast from California to British Columbia. An unmeasured but believed to be comparatively small number of these brant winter along the coasts of Japan, eastern U.S.S.R., and Alaska. Distribution and fall migration routes are shown in Figures 1 and 1A.

Status - Brant wintering in surveyed areas along the Pacific Coast averaged 140,000 birds from 1973 to 1982. When considering the marked fluctuations in numbers of some arctic-nesting geese, the Pacific Brant has displayed a remarkable stability in numbers since surveys were initiated in 1936 (Figure 2).

#### Rationale for Objectives

The population and distribution objectives are intended to restore brant as a wintering bird in coastal Washington, Oregon, and California, to near historic levels and, thereby, increase hunting opportunities.

#### Problems

Inadequate Ecological Information - A major problem is the inability to make informed decisions concerning the management of Pacific Brant because of inadequate information on certain aspects of the ecology, distribution and habitat requirements of breeding birds; habitat requirements of molting and staging birds; habitat requirements of wintering and migrating birds; and the magnitude and nature of mortalities, particularly hunter harvests.

A primary concern is the southward shift in wintering distribution of Pacific Brant and the resulting changes in distribution of fall-winter harvests. Sometime in the late 1950s, numbers of brant wintering in Washington, Oregon, California, and British Columbia declined, while numbers increased in Mexico (Figure 2). This shift, combined with restrictions in harvest intended to reverse the conditions, reduced harvests in British Columbia, Washington, Oregon, and California from about 10,000 during the early 1960s to about 3,000 during the 1980s. Harvests are believed to have increased in Mexico and currently may exceed 6,000 birds. Fall harvests in Alaska have increased and are believed to generally reflect increases in the population of hunters.

As with most species of geese, the major cause of mortality among Pacific Brant is believed to be hunting; however, estimates of harvest are inadequate. Only the regulated fall harvests in the U.S. and Canada are estimated (Table 2), but these estimates are imprecise because surveys inadequately sample the relatively small and specialized group of brant hunters. The harvest in Mexico during the past 10 years is believed to be about half of the regulated fall-winter harvest in the U.S. and Canada but is becoming proportionately greater as harvests in the northern areas decrease through both restrictions in hunting and shifts in wintering distribution. The spring-summer subsistence harvests of brant and their eggs is unmeasured but believed to equal or exceed the regulated fall-winter harvest. Most of the spring-summer harvest is believed to occur on the Yukon-Kuskokwim Delta where harvests of adults, young, and eggs by subsistence hunters have been estimated to average 15,000 brant. Subsistence harvests occur further north in coastal Alaska and in parts of arctic Canada and Siberia; and while believed to be of lesser importance to the population as a whole, they may be of significance to particular flocks and preclude expansion into unoccupied but otherwise suitable habitats.

There is insufficient knowledge about the spatial and temporal distribution and harvest rates of the various subpopulations of brant to know whether it is one, several, or all groups being adversely affected by habitat changes and hunting and causing the shifts and decline in the wintering population.

Pacific Brant experience a wide fluctuation in production on the Yukon-Kuskokwim Delta, their principal nesting grounds, as a result of natural phenomena such as flooding from spring storm tides, unavailability of nest sites due to retarded melt of snow and ice, and predation. In other nesting areas in northern Alaska, Canada, and the U.S.S.R. the fluctuations in productivity are even larger and may result in nesting failure in certain years and even in successive years. These years of poor reproduction are reflected in reduced fall flights and harvests. There is no operational survey that forecasts the fall flights so that appropriate changes in regulations could be made before the first seasons legally open in Alaska and arctic Canada.

**Change in Winter Distribution** - While not affecting the population status as a whole, the decline and causes for the reduced numbers of brant wintering in British Columbia, Washington, Oregon, and California (Figure 2) are major problems faced by agencies and sportsmen of the Pacific Coast. Overhunting and degradation of habitats from a multitude of sources have been suggested as reasons for this southward shift in wintering location. Experience with other goose populations suggests that efforts to alter conditions of habitat or traditions of migration in order to reestablish wintering populations will be difficult at best and perhaps impossible. Increasing the survival rate of those brant wintering in northern areas is a viable strategy but requires gaining knowledge of the breeding, origin and mortality factors (including subsistence harvests) impacting those birds before they reach their wintering locations.

**Maintaining Habitat** - While habitat necessary to meet population objectives exists and receives various measures of protection through Federal, State, and Provincial management of land and waters, there continues to be inroads through changing land ownership and degradation. Principal nesting areas of brant on the Yukon-Kuskokwim Delta, on the Alaskan arctic coast, and in the Canadian western arctic are adjacent to areas either already leased for petroleum development or scheduled for lease sales. The many intertidal nesting habitats and staging areas at Izembek Lagoon would be

particularly vulnerable to oil pollution. Development of areas adjacent to Teshekpuk Lake threaten the principal molting area of brant. Expansion of reindeer husbandry on coastal tundra poses uncertainties for brant and other waterfowl. Urban transportation, agricultural developments, commercial fishing, and recreation along the Pacific Coast of Canada and the lower U.S. degrade the previously important wintering and migration stopover areas for brant. While brant are provided sanctuary in Ojo de Liebre (Scammon Lagoon) and San Ignacio Lagoon (47% of wintering brant in Mexico), increasing uses of the offshore and coastal resources in Mexico will have an unknown but probably significant effect on other important habitats.

### Strategies

The following list of Pacific Brant management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium, and low priorities, respectively.

#### REGIONAL PRIORITIES

R1	R7	R8	R9
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#### I. Harvest guidelines.

- A. Alter hunting programs (which may or may not include restrictive harvests) to achieve distribution and population objectives of wintering brant when numbers are above the 3-year-average of 120,000 birds.

1	3	-	2
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- B. There will be no hunting of this population when the 3-year-average index of the winter population is below 120,000 brant. Resumption of hunting will not be considered until the average index rises above 140,000 brant.

1	1	-	1
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- C. Provide for regulated spring and summer subsistence harvest of Pacific Brant in Alaska by amending the Migratory Bird Treaty with Canada.

3	1	-	1
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#### II. Protect habitats in sufficient quantities and quality to meet population and distribution objectives.

- A. Preserve via land exchange and/or easements the "22g" lands and other inholdings conveyed to Natives along entire coastal strip of Yukon-Kuskokwim Delta nesting habitat within 15 miles of coastline between Yukon and Kuskokwim River mouths. In the interim the FWS should negotiate Alaska Land Bank agreements with 46 Native village corporations throughout the entire Y-K Delta to provide habitat protection in exchange for FWS

July 1985

REGIONAL PRIORITIES  
R1 R7 R8 R9

assistance in land-use planning; controlling trespass; fire, fish, and wildlife conservation; and, on Native lands, exemption from taxation and adverse actions.	-	1	-	1
B. Participate in planning and operational monitoring phases of development activities and in coastal zone planning that impact essential habitats of Pacific Brant.	1	1	-	3
C. FWS should immediately pursue a land exchange with the state to place Izembek Lagoon in the National Wildlife Refuge System as an additional measure of protection against adverse development and human disturbance. The Bristol Bay Cooperative Management plan is one vehicle to use or FWS can act independently to effect the exchange. In addition, FWS should encourage the state and the Bureau of Land Management to give maximum protection to the Lagoon and adjacent uplands in developing plans and stipulations for oil and gas leasing, production, transportation, and related infrastructure.	-	1	-	1
D. Develop and propose national legislation to transfer the Teshekpuk Lake complex from BLM to FWS and establish it as a NWR to increase the degree of protection for molting brant. Also, encourage the Secretary of Interior to withdraw the Teshekpuk Lake complex and adjacent buffer zone from all oil and gas leasing and, during the period May 15 to September 1, prohibit all commercial activity in the area. Moreover, reject any further proposals to transfer land to private or corporate ownership within or adjacent to the complex.	-	1	-	1
E. Purchase in fee title selected high priority areas in the following locations: (Port Susan Bay, Padilla Bay, Gray's Harbor, Willapa Bay, Columbia River areas, Tillamook Bay, Yaquina Bay and Coos Bay).	1	-	-	1
F. Develop and implement guidelines on Service lands for reindeer husbandry so as to minimize or prevent losses to waterfowl, and encourage similar measures on other brant habitats that are either managed by other agencies or privately owned.	-	2	2	-

REGIONAL PRIORITIES				
	R1	R7	R8	R9
G. Protect eelgrass from physical disturbance from such practices as aquaculture, "oystering" and "sandshrimping."	2	2	-	-
H. Minimize the possibility of oil contamination to habitats used by brant by excluding oil development, transportation, and storage near these areas and develop oil-spill contingency plans to mitigate damages should they occur.	2	2	-	-
I. Minimize human uses (boating, hunting, etc.) in important brant areas that are suspected of limiting population numbers because of such disturbance.	2	2	-	-
J. Develop dialogue with other countries to impress upon them the values of preserving brant habitat and suggest management strategies that would benefit brant and their habitats.	-	-	-	1
III. Improve coordination of management actions and research.				
A. Coordinate management and research activities between R-1, 7, 8, and 9 and with State agencies through the Pacific Flyway Council/Study Committee, and with Canada, Mexico, and the U.S.S.R. during annual bilateral meetings.	1	1	1	1
B. Involve greater participation by Natives of the Y-K Delta in planning processes related to goose management.	1	1	-	3
IV. Improve quality of information on status of the population and its habitat and harvest.				
A. Determine the extent and distribution of subsistence harvest in Alaska.	-	1	1	-
B. Encourage Canada to obtain better data on the extent and distribution of subsistence harvests, and Mexico to obtain better data on the sport harvest.	-	-	-	1

July 1985

REGIONAL PRIORITIES				
	R1	R7	R8	R9
C. Continue operational surveys of wintering brant populations and brant productivity.	1	2	-	1
D. Expand and improve surveys, research and banding programs of Pacific Brant in Alaska.	3	1	1	3
E. Determine relationships between flocks wintering in the U.S. and breeding grounds.	1	1	1	2
F. Determine effects of grazing by reindeer on nesting habitat of Black Brant and conditions under which grazing must be prevented or may be made acceptable.	-	2	2	-
V. Improve public awareness of the needs of brant.				
A. Initiate information and education programs to publicize the importance of and to encourage protection of nesting, staging, and wintering habitats of brant. Principal target groups would include the Migratory Bird Conservation Commission, borough planners, administrators of the Section 10/404 wetland permit program, and State and Federal energy development and land disposal agencies. In Alaska this would include Coastal Zone Management Program administrators, Native leaders, and Alaska Board of Fisheries and Game. In California, this would also additionally include Corp of Engineers, sportsmen groups, and the California Fish and Game Commission.	1	1	1	1
B. The Service should develop and implement a bilingual information and education program keying on the Yupik Eskimos in the 46 Y-K Delta villages, teaching concepts of wildlife management and the importance of habitat in maintaining waterfowl and other fish and wildlife populations which are important to their subsistence lifestyle. This would require a long-term program to obtain measurable results as reflected by changes in attitudes toward wildlife and habitat. This strategy would result in informed decisions by residents of 46 villages who have control over more than 5 million acres of Y-K Delta habitat via their Native corporations.	-	1	-	1

July 1985

### Implementation

The objectives and strategies in this Plan are consistent with FWS Regional Resource Plans (RRP) developed by Regions covering portions of the Pacific Brant's range. The Regions will use the detailed operations plans in their RRP's to implement these strategies as expeditiously as funding and manpower permit.

### Sources

This plan was derived from the U.S. Fish and Wildlife Service Regional Resource Plans for Regions 1 and 7 and from the Pacific Flyway Management Plan for Pacific Brant (July 1981) that was prepared cooperatively by the Pacific Flyway Council, FWS, Canadian Wildlife Service, British Columbia, and Direccion General de Flora y Fauna Silvestres de Mexico.

### For Further Information Contact:

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240; 202/254-3207.

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Table 1. Current and objective levels for Pacific brant populations and harvests.\*

	Current (1973-82)					Objective				
	U.S.	Canada	Mexico	U.S.S.R.	Total	U.S.	Canada	Mexico	U.S.S.R.	Total
Harvest	?	?	?	?	?	23,000	6,000	12,000	1,000	42,000
(Wintering Areas)	(4,100)**	(200)	?	?	?	(12,000)	(2,000)	(12,000)	(?)	(26,000)
(Summering Areas)	?	?	(0)	?	?	(11,000)	(4,000)	(0)	(1,000)	(16,000)
Breeding Population	?	?	0	?	?	38,000	10,000	0	2,000	50,000
Fall Flight	?	?	0	?	?	158,000	46,000	0	6,000	210,000
Winter Population	10,400	?	128,200	?	?	58,000	8,000	119,000	(?)	185,000
(Alaska)	(?)					(no obj.)				
(Washington)	(8,600)					(25,000)				
(Oregon)	(1,400)					(3,000)				
(California)	(400)					(30,000)				

\*The Pacific Flyway Management Plan for Pacific Brant (Pacific Flyway Council 1981) identified only objectives for Winter Populations because these objectives addressed a serious distributional problem and because the Winter Waterfowl Survey is the only operational survey providing reliable information on the status of the population. Harvest, Breeding Population, and Fall Flight Objectives in this plan were developed independently by the FWS and therefore without assurances of agreement by either Canada, Mexico, U.S.S.R., or the Pacific Flyway Council. These objectives are extrapolations from the Midwinter Population Objectives using the following rationale and assumptions: During 1963-82 the winter population, with a less than desired distribution, averaged about 132,000 brant and was assumed to have a fall-winter harvest of 15,000 brant, a spring-summer harvest of an additional 15,000 brant (or equivalency in eggs and goslings), or 30,000 brant in the total harvest. With the objective of increasing the number of wintering brant from 132,000 to 185,000, the harvest is proportionately increased from 30,000 to 42,000 birds. Allocating the harvest 60% to wintering areas (British Columbia and south) and 40% to summering areas (Alaska, arctic Canada, U.S.S.R.) the fall-winter harvest would be 26,000 and the spring-fall harvest in northern areas would be 16,000 birds (or their equivalency in eggs). A fall flight of 210,000 would be required to sustain the 42,000 (20%) harvest. Assuming that the fall flight would average 50,000 young (24% young in population during 1964-83), that there was an average of 75% nesting success among breeding-age brant, and that the family groups size was 2.7 young per pair, at least 50,000 breeding-age brant would be required to achieve the fall flight. An average fall flight would be comprised of 50,000 young, 37,000 successful breeders, 13,000 failed breeders, and 110,000 subadults.

\*\*Includes regulated fall harvest in the summering area (i.e. Alaska).

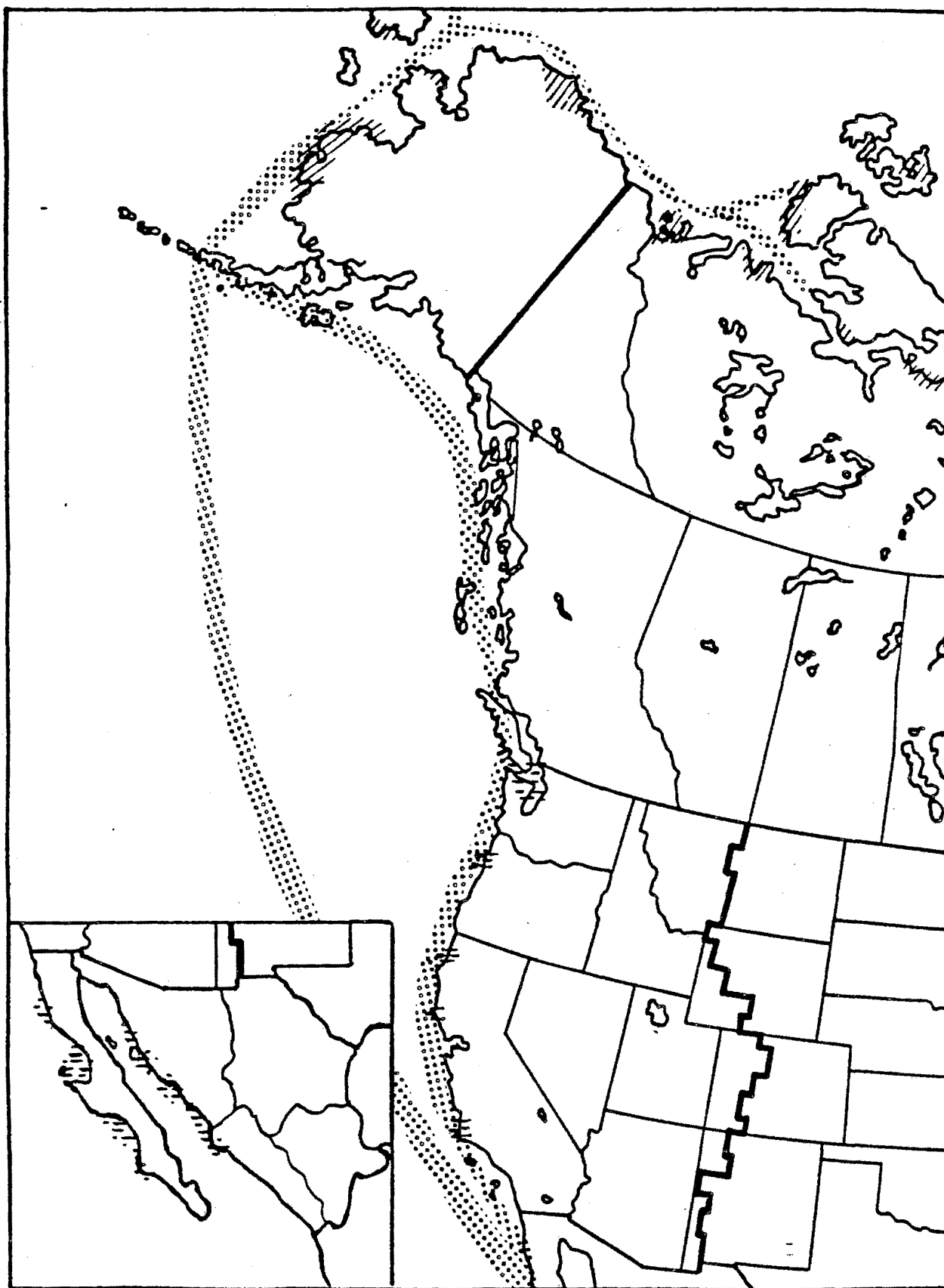


Figure 1. Breeding, Migration, and Winter Distribution of Pacific Brant.

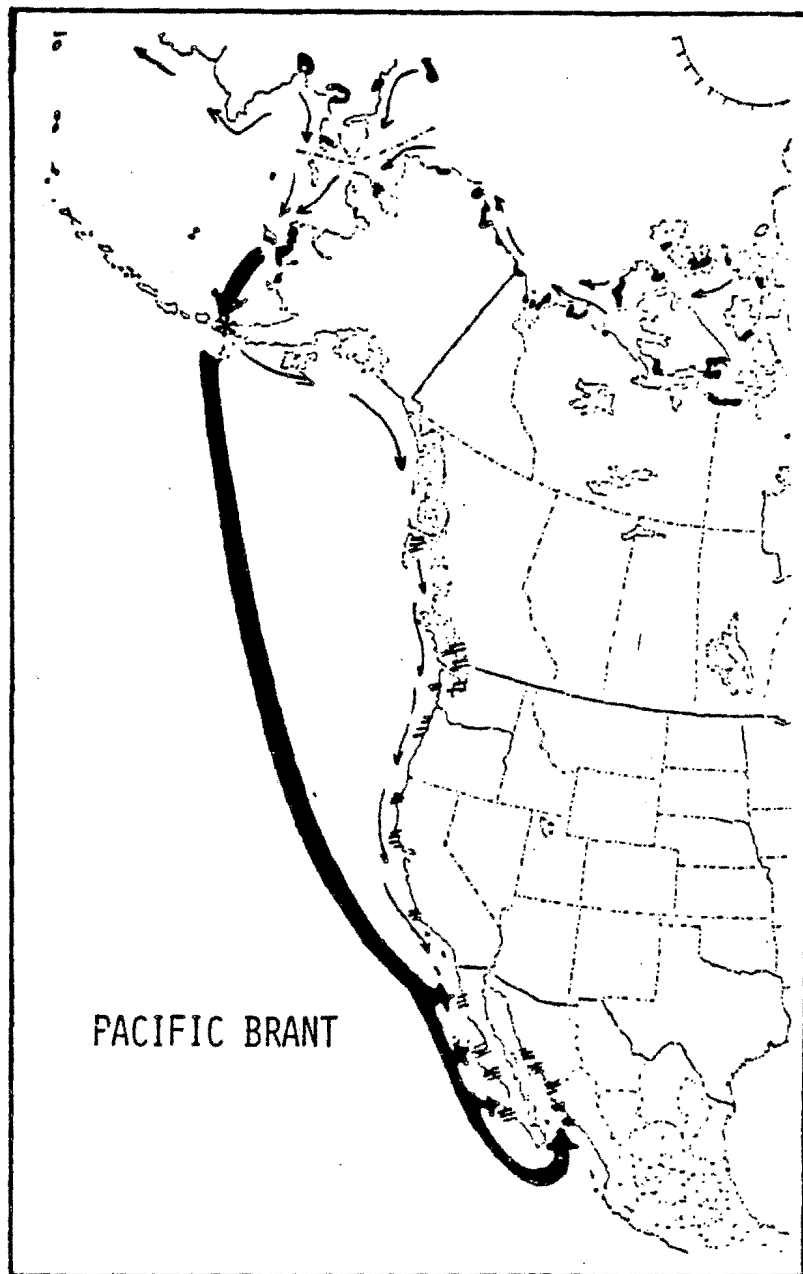


Fig. 1A. Pacific brant distribution showing nesting areas, migration routes, Izembek Lagoon staging area, and principal wintering areas.

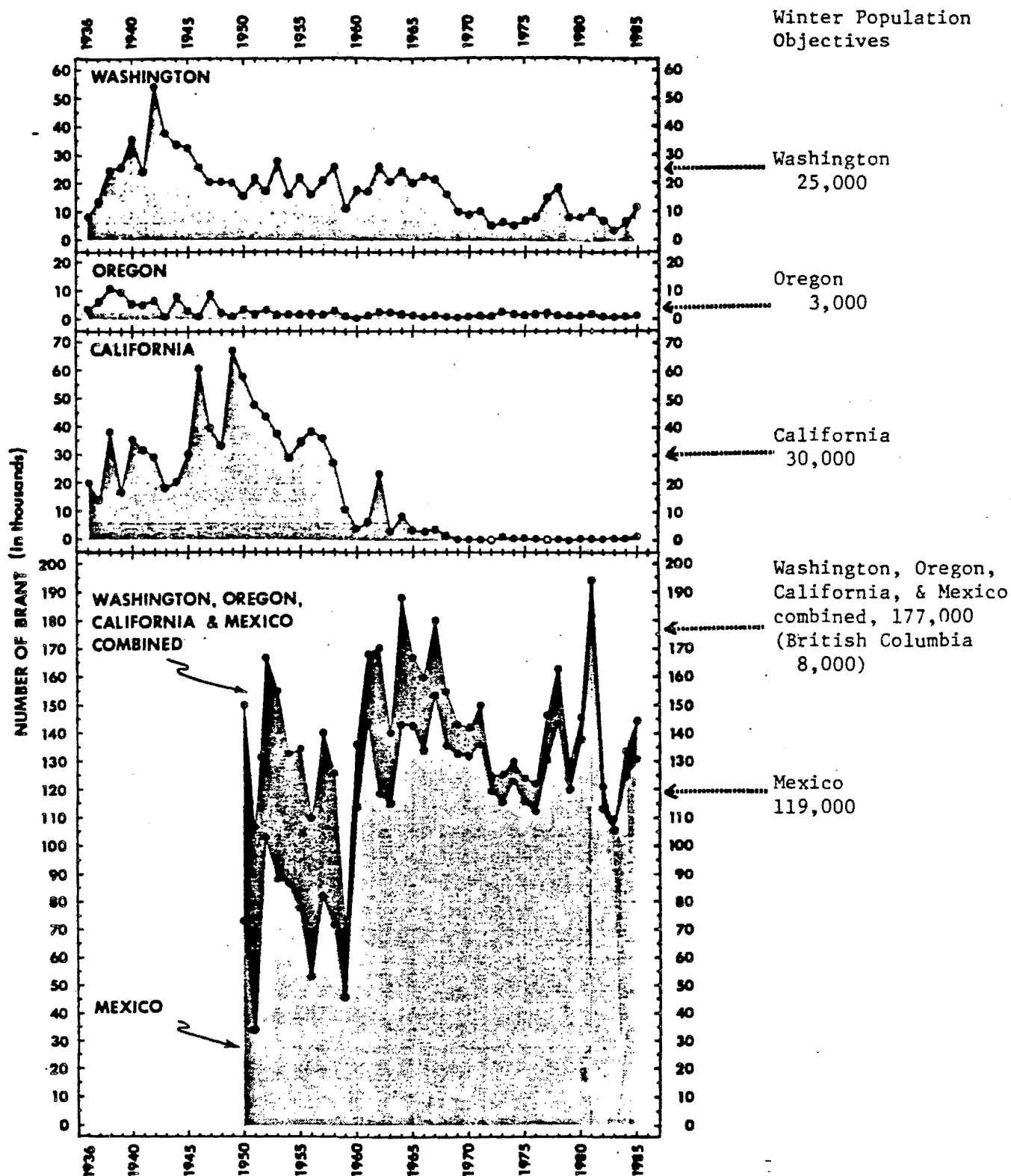


Figure 2. Annual indices of Pacific brant wintering within the Pacific Flyway but excluding those in Alaska and British Columbia and population objectives (3-year-average).

## MIGRATORY BIRD NATIONAL RESOURCE PLAN FOR THE VANCOUVER CANADA GOOSE

### Purpose

This document communicates the objectives, strategies, and priorities for nationwide management of the Vancouver Canada goose (Branta canadensis fulva) that were developed through the Regional Resource Planning process of the U.S. Fish and Wildlife Service (FWS). Lead Office or Region for this plan is Region 7 with support from Region 1.

### National Objectives

The breeding, migration, and wintering distribution of these Canada geese are limited to the Pacific Flyway (See Pacific Flyway Objectives).

### Pacific Flyway Objectives

- . Maintain Vancouver Canada geese at their present population levels, approximately 90,000 birds, throughout its existing range.
- . Expand the population of Vancouver Canada geese into presently unoccupied portions of its historic range.
- . Maintain optimum opportunities for sport hunting and provide for viewing, educational and scientific pursuits of Vancouver Canada geese.

### Regional Objectives

Because the distribution of Vancouver Canada geese is restricted primarily to Region Seven, regional objectives are presented under Pacific Flyway objectives.

### Population Distribution and Status

Distribution - Vancouver Canada geese are birds of the Pacific Northwest coast (Figure 1). They nest in the coastal rain forest and use salt- and tide-water habitats throughout the remainder of the year. By comparison to other Canada geese, Vancouvers are relatively sedentary and, at most, short-distance migrants. About 300 Vancouvers winter in Port Susan, Washington; a few hundred Canada geese, presumably Vancouvers, winter in Prince William Sound, Alaska; and a few others can likely be found as wintering birds scattered along the coasts of Washington and Oregon. Of 4,665 Vancouver Canada geese banded in southeastern Alaska (93 percent in Glacier Bay), percentages recovered in Alaska, British Columbia, Washington, and Oregon were 83, 3, 1, and 12 percent, respectively. However, because of differential harvest and reporting rates it is theorized that less than 2 percent migrate as far south as Oregon, with southeastern Alaska being more important to the subspecies than previously thought.

Status - In 1971, biologists speculated that there were 80,000 Vancouvers in southeastern Alaska and perhaps another 7,000 on Queen Charlotte and Vancouver Islands in British Columbia; however, these estimates are probably high. Winter surveys in Alaska and British Columbia have not been conducted annually since the early 1960's. The maximum count of Canada geese in southeastern Alaska was 9,740 in 1954; counts averaged 4,424 during 1953 to 1962. The maximum count of Canada geese in coastal British Columbia was 1,846 in 1955, and the counts averaged 882 during 1955 to 1963. Estimates based on a systematic survey of waterfowl in the northcentral portion of southeastern Alaska in March 1980 estimated that the Canadas numbered  $4,549 \pm 47$  percent.

### Rationale for Objectives

The objective statements for Vancouver Canada geese presented in this plan are designed to maintain the population at the current level in its existing range and expand the distribution into unoccupied portions of its historic range.

### Problems

Habitat Degradation - Degradation of habitat as a result of timber harvest, hydropower development, mining and other resource development activities is a potential problem for this species. There is potential competition for lands used by both geese and the timber industry. Geese prefer uneven-aged, old-growth, forested areas for nesting. However, their requirements for old-growth timber and their compatability with early forest succession and/or clearcutting need to be determined. Timber harvesting in southeast Alaska is currently a major industry and may expand due to the mandates in the Alaska National Interest Lands Conservation Act (ANILCA). Clear-cut logging on Baranof, Chichagof, Kupreanof, and Prince of Wales Islands, especially near coastal wetlands, estuaries and river deltas may adversely impact breeding habitats.

Of immediate concern are various mining ventures that within 5 to 7 years may begin ore production and export. For example, mining activities at Boca de Quadra and Admiralty Island may degrade habitats through alteration or contamination of wetlands and estuaries important to geese. Several proposed hydropower projects in southeastern Alaska, including the Stikine River, may alter stream flows, estuaries and deltas and affect aquatic food resources. Alteration of habitat due to urbanization in the Juneau/Mendenhall tidal flats is also occurring.

Lack of Life History Information - The Vancouver Canada goose is a solitary nesting bird that prefers mature northern rain forests in Southeast Alaska. Relatively little is known of their breeding biology or population dynamics and even less information is available on their winter ecology. The FWS's inability to make informed decisions regarding the management of Vancouvers is due to the lack of sufficient information. This information is needed to evaluate the potential impacts of resource development activities on Vancouver Canada geese.

### Strategies

The following list of Vancouver Canada goose population management strategies is indexed by priority for FWS regions. The priority scale of 1, 2, and 3 represents high, medium, and low priorities, respectively.

July 1985

<u>REGIONAL PRIORITIES</u>		
<u>R7</u>	<u>R8</u>	<u>R9</u>

I. Increase knowledge of life history

- |  |   |   |   |
|--|---|---|---|
| A. Improve and expand survey, research and banding programs in Alaska. | 1 | 3 | 3 |
|--|---|---|---|

II. Protect critical habitat

- |  |   |   |   |
|--|---|---|---|
| A. Identify and determine threats to all key production, molting, and fall staging habitats of Vancouver Canada geese in Southeast Alaska.                                     | 1 | 3 | 3 |
| B. Participate in the planning, permitting, and operational monitoring phases of development activities potentially impacting Vancouver Canada goose populations and habitats. | 2 | - | - |

Implementation

The objectives and strategies presented in this plan are consistent with the Regional Resource Plans (RRP) developed by Region 7 of the U.S. Fish and Wildlife Service. The region will use the detailed operations plans contained in their RRP's to implement these strategies as expediently as funding and manpower permit.

Sources

This plan was derived from the U.S. Fish and Wildlife Service's Regional Resource Plans for Region 7.

For Further Information Contact

Chief, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240 (202/254-3027).

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Figure 1. Primary year-around range of Vancouver Canada geese and places named in text.