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CONCEPT PLAN FOR WATERFOWL WINTERING HABITAT PRESERVATION



CALIFORNIA COAST

REGION ONE PORTLAND OREGON FEBRUARY 1979

CONCEPT PLAN

FOR

WINTERING WATERFOWL HABITAT PRESERVATION

1979

CALIFORNIA COAST

PRIORITY CATEGORY 6

PREPARED BY

U.S. DEPARTMENT OF INTERIOR

FISH & WILDLIFE SERVICE

PORTLAND, OREGON

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PREFACE

The Director of the U.S. Fish and Wildlife Service (FWS) on January 20, 1976, because of habitat preservation needs, set forth new policy guidance and procedures for implementing the Migratory Bird Land Acquisition Program for the next 10-15 years. A national priority system has been developed for the program and will guide the acquisition efforts.

California's Coast provides wintering wetland habitat critically important for some species of Pacific Flyway waterfowl. This habitat is ranked number six out of 33 overall on the national priority scale (Appendix A). It is the third highest priority for wintering habitat preservation nationally. It is being proposed that "key" wintering habitat, presently unprotected, be preserved with Migratory Bird funds by easement or fee acquisition if other preservation methods (e.g., state, local zoning, public trust) prove ineffective. The emphasis will be placed first on the protection of existing wintering habitat which requires little or no additional development to derive principal benefits. However, natural, unmanaged wetlands have been largely destroyed along California's Coast. As a result, strong emphasis will also be placed on restoration of tidal wetlands.

The Concept Plan presented herein for the coast of California has been prepared in partial fulfillment of requirements for the Service's Migratory Bird Land Acquisition Program and describes a wetland preservation program utilizing funds derived from the sale of Federal Migratory Bird Hunting and Conservation Stamps only. Other funding sources may complement this program. The Plan also describes the wetland areas, their importance to waterfowl populations, and threats to their continued survival.

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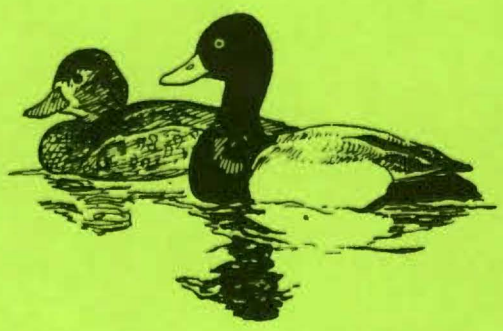
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Summary

SUMMARY

The California Coast has been divided into six management regions by the State's Coastal Zone Conservation Commission. These include the North Coast, North Central Coast, Central Coast, South Central Coast, South Coast, and the San Diego Coast regions. These regions, along with the SF Bay area, were used as subunits to facilitate coastal wetland analysis for this Concept Plan. Each of these units has wetland habitat important to wintering waterfowl of the Pacific Flyway.

When all species are taken together, California Coastal wetlands support less than five percent of the Pacific Flyway waterfowl population during the winter. However, this percentage is considerably higher for key species such as pacific brant, canvasbacks, scaups, ruddy ducks, scoters, goldeneyes, buffleheads, and mergansers. Coastal wetlands are also important in fall and spring periods when use by brant, pintails, wigeons and shovelers peaks. The entire population of Aleutian Canada geese relies on coastal wetlands in fall and spring.

California originally contained five million acres of wetlands -- including about 381,000 acres along the coast. To date, approximately 91 percent of the state total and 70 percent of the coastal wetlands have been destroyed. Most coastal wetland losses have resulted from dike and fill operations to provide land for agriculture, urban-industrial developments, and harbor facilities. Diking for salt pond development has also been a significant factor. Diversion of freshwater away from coastal estuaries has caused degradation of remaining marshes. This destruction has contributed to the shortage of winter habitat in California relative to the available breeding habitat. This inbalance has reached a point where wintering habitat may be limiting the populations of some Pacific Flyway waterfowl. Conversion of existing tidal marsh to other uses has largely been stopped in California, but wetland losses behind dikes continue. Competition for water and decreasing water quality continue to degrade remaining coastal wetlands.

Presently, about 76,000 acres of private and contested lands; 28,000 acres of Federal National Wildlife Refuges; 15,500 acres of State Wildlife Managment Areas and Ecological Reserves; and 20,000 acres of other federal, state, and local lands provide marsh and upland habitat important to waterfowl along California's coast. With few exceptions, the existing tidal marsh is secure but wetlands behind dikes are not. It is proposed that ongoing acquisition projects continue, but that acquisition and restoration of former tidal marsh be the highest priority along the California Coast.

The coastal acquisition program has five objectives as listed below in priority order:

1. To continue ongoing and authorized NWR acquisition and development as originally proposed. This includes preservation of existing tidal marsh and mud flats, and restoration of diked lands.

2. To initiate ascertainment studies to determine the feasibility of acquiring and restoring diked former tidelands to productive tidal and/or managed marsh for inclusion in the National Wildlife Refuge system.

3. To initiate ascertainment studies to determine the feasibility of preserving by fee or easement acquisition upland areas surrounding existing and restorable former tidelands, if necessary, to protect wetland integrity.

4. To initiate ascertainment studies to determine the feasibility of preserving existing tidal marsh by fee acquisition or lease in conjunction with restoration projects where management of the resulting habitat unit would be facilitated and/or where a threat of loss develops.

5. To initiate ascertainment studies to determine the feasibility of preserving existing nontidal wetlands for inclusion in the National Wildlife Refuge System.

Acquisition lists were developed for ongoing projects, restoration/development projects, and nontidal wetland preservation projects (Tables i, ii, and iii). These lists were developed with the assistance of the California Department of Fish & Game, citizen conservation organizations, and private individuals. Subjective threat and biological value criteria were developed and used to develop tentative priorities. Costs and acreage estimates are detailed in the tables. The ascertainment process will determine upland areas and existing tidal marshes which require preservation.

Table i. Ongoing and Authorized Projects Proposed for Continued Acquisition

Area	Acres Remaining to be Acquired with MBCA or leased [1]	Cost	Additional Acres of tidal marsh & mud flats proposed for acquisition MBCA	Cost
SF Bay NWR [2]	---	---	2000 [3]	1.0 million
San Pablo Bay NWR [6] and Napa Marshes	4450	2.2 million	1500 [3]	750,000
Humboldt Bay NWR [4]	8600	1.5 million	4000 [3]	2.0 million [7]
Lake Earl-Talawa [4]	0	---	5000 [5]	2.75 million
Petaluma Marsh [4]	600	300,000	none	---

[1] Tidal marsh, mud flats, and diked tidelands
[2] LWCF funds
[3] In conjunction with restoration projects (Table ii) and/or if a threat developes only.
[4] CDFG proposed or ongoing acquisition; FWS involvement only if needed
[5] Nontidal, freshwater
[6] FWS and CDFG will both be involved in this area
[7] State tideland leases are obtained at no cost

Table ii. Proposed Acquisition and Restoration of Diked Former Tidelands Listed in Order of Priority

	Area	Estimated Acreage Potentially Restorable*	Estimated Cost
1.	Napa Marshes	20,000	22.68 million
2.	Petaluma Marsh	1,500	
3.	Gallinas Creek Marsh	800	
4.	Novato Creek Marsh	2,400	
5.	San Rafael Marsh	250	
6.	North Richmond Marsh	400	
7.	South SF Bay	20,000	
8.	Humboldt Bay-Mad River Slough	1,200	600,000
9.	Bolsa Chica-Santa Ana River Mouth	800	400,000
10.	Moro Cojo Slough-Old Salinas River	1,000	500,000
11.	Tomales Bay	500	250,000
12.	Eel River Delta	1,500	750,000

* Note: This is not necessarily a proposed acreage. Acquisition acreages are to be proposed in Ascertainment Reports.

Table iii. Existing Nontidal Wetlands Proposed for Preservation with MBCA Funding Listed in Priority Order

	Area	Acres	Cost
1.	Dune Lakes-Oso Flaco Lake	1,400	700,000
2.	Whelan Lake-San Luis Rey River	160 plus**	80,000 plus
3.	McClusky Slough	250	125,000
4.	Mugu Lagoon Area*	620	310,000
		TOTAL	1,215,000

* Mugu duck club habitat ascertainment studies will be undertaken only if a threat developes in the future.

**Exact acreage which would be included in San Luis Rey River corridor and cost will not be known until ascertainment reports are completed.



North Central Coast--Point Reyes and Bolinas Lagoon



I. Location & Description

MIGRATORY BIRD LAND ACQUISITION PROGRAM
REGION I
CALIFORNIA COAST
CATEGORY 6

I. LOCATION AND DESCRIPTION

The California Coast is included within the Pacific Flyway (Figure 1) and extends 1,072 miles from the Oregon border south to Mexico. The Coastal Zone, excluding San Francisco Bay, includes parts of 15 counties and is generally defined by the California Coastal Commission as extending three miles at sea and five miles inland of the mean high-tide line. San Francisco Bay is under jurisdiction of the Bay Conservation and Development Commission, and includes an additional six counties.

Sixty-four per cent of California's population is located in the coastal counties, and 25 per cent of the total State population lives within six miles of the coast. The southern coastal counties are much more heavily populated than the northern counties (76 per cent of the total coastal population lives in the three Counties of Los Angeles, Orange, and San Diego--while only three per cent lives in the counties north of San Francisco).

Major river drainages flowing to the coast include--from north to south--the Smith, Klamath, Mad, Eel, Mattole, Ten Mile, Big, Navarro, Garcia, Russian, Sacramento-San Joaquin, Pajaro, Salinas, Santa Maria, Santa Ynez, Los Angeles, Santa Ana, Santa Marguerita, San Diego and Tijuana. Estuaries formed by these rivers and numerous other smaller creeks, freshwater ponds, and lagoons form the coastal wetland habitat. The wetlands are not continuous along the coast but are associated with specific streams and are relatively small--with the exception of the Humboldt and San Francisco Bay areas.

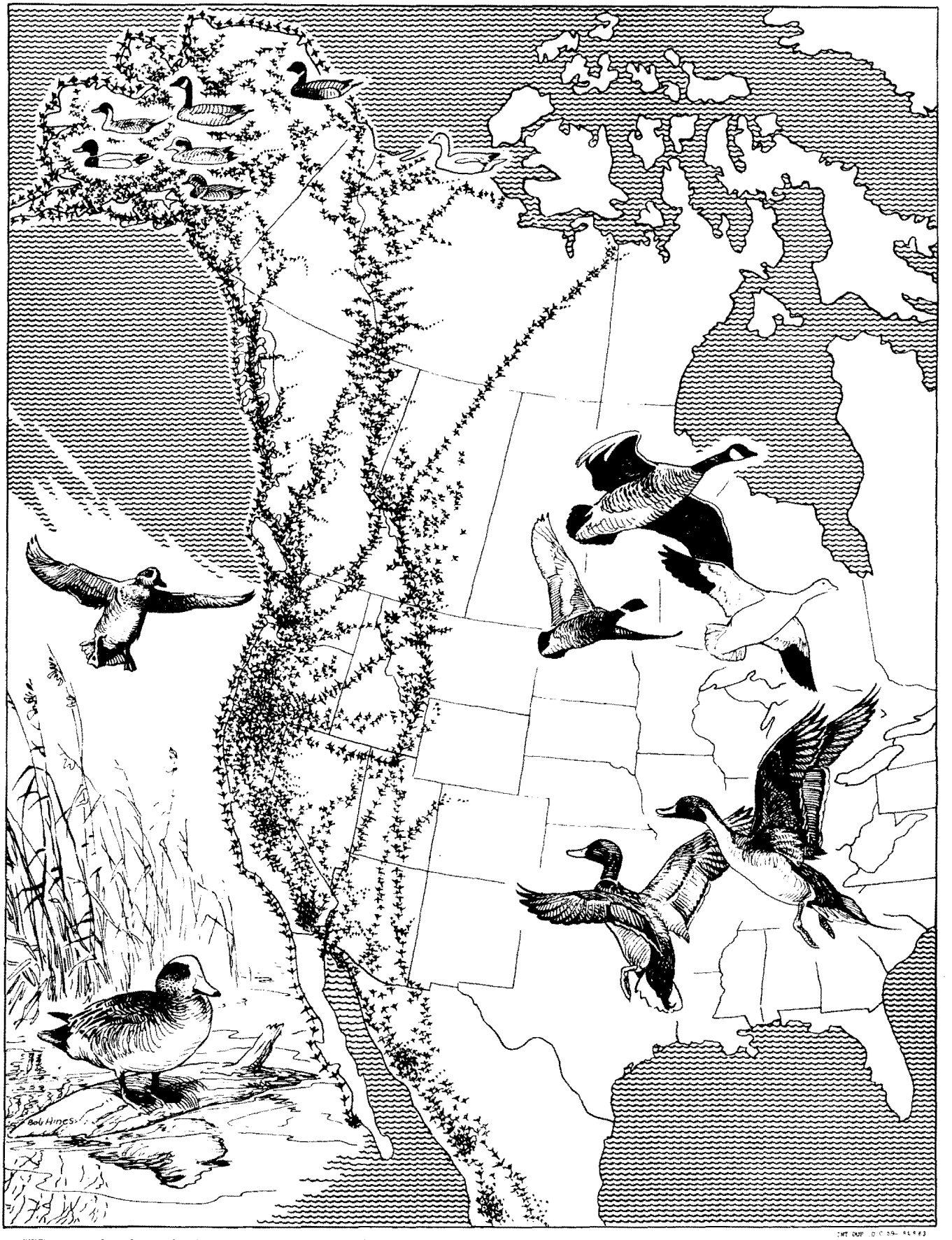
California's coastal zone was divided into six management regions by the state's coastal zone conservation commission and will be used for acquisition planning. Each of these regions, along with the San Francisco Bay area (Figure 2), has unique wetlands, waterfowl populations, and habitat related problems associated with them. Together, they comprise the areas of ecological concern for the purposes of this Plan. The regions are listed below:

1. North Coast Region
   Del Norte, Humboldt, and Mendocino Counties

2. North Central Coast Region
   Sonoma, Marin, and San Francisco Counties

FIGURE 1

PACIFIC FLYWAY



UNITED STATES DEPARTMENT OF THE INTERIOR • FISH AND WILDLIFE SERVICE

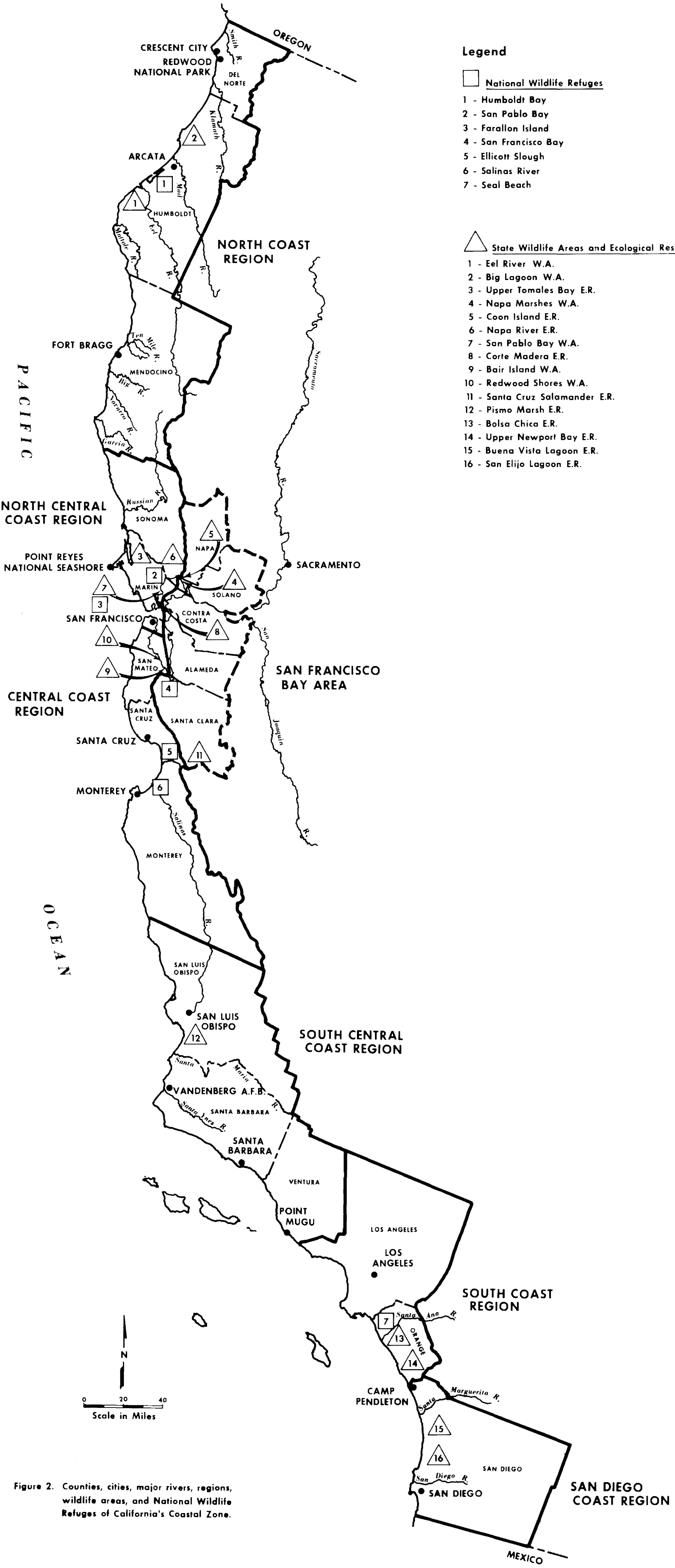


Figure 2. Counties, cities, major rivers, regions, wildlife areas, and National Wildlife Refuges of California's Coastal Zone.

3. Central Coast Region
   San Mateo, Santa Cruz, and Monterey Counties

4. South Central Coast Region
   San Luis Obispo, Santa Barbara, and Ventura Counties

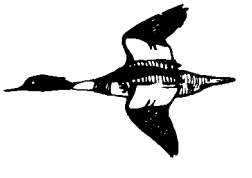
5. South Coast Region
   Los Angeles and Orange Counties

6. San Diego Coast Region
   San Diego County

7. San Francisco Bay Area
   Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco Counties

The ownership of coastal wetlands is complex. Wetlands exist under private and local ownership; State tidelands; public trust; State Wildlife Areas (WMAs), Parks, and Ecological Reserves (ER); and National Wildlife Refuges (NWRs). Many ownerships are contested.

Many of the wetlands are typical estuarine types under tidal influence, but a significant acreage has been diked to create salt evaporation ponds, agricultural lands, pastures, or in preparation for land development. Coastal wetlands provide significant wintering and migrational areas for Pacific Flyway waterfowl, as well as shorebirds and waders.



Pacific Brant



II. Description of Waterfowl Populations

II. DESCRIPTION OF WATERFOWL POPULATIONS

A. Principal Habitat Function

The Pacific Flyway covers the western portion of the North American Continent and portions of the Arctic in eastern Asia. Most Pacific Flyway waterfowl are produced in the prairies and parklands of western Canada and the river valleys and deltas of Alaska, British Columbia, the Northwest Territories, and the Soviet Union. Only about 15 percent of the Flyway's waterfowl are produced south of the Canadian border. Most Pacific Flyway waterfowl winter from Washington to Mexico.

The principal habitat functions of California coastal wetlands are: (1) to furnish wintering waterfowl with sufficient food, rest, and space to minimize natural mortality through the fall and winter months; (2) to return adequate numbers of healthy birds to the breeding grounds to insure maintenance of Flyway population levels; (3) to provide spring and fall migration habitat for birds wintering in southern California and Mexico; (4) to provide "back-up" habitat during dry years when Central Valley habitat is minimal; (5) to aid in the prevention of depredation of agricultural crops by waterfowl--primarily, pintails and wigeons.

California originally contained between four and five million acres of prime coastal and inland wetlands important to wintering waterfowl. Today, over 90% of these wetlands have been destroyed and, in some cases, existing habitat has deteriorated. Waterfowl remain abundant, however, because of continued high productivity and stability of Pacific Flyway breeding grounds. Thus, wintering grounds continue to support relatively more birds with less and less habitat. This continued degradation of wintering habitat in California has progressed to the point where wintering--not breeding--habitat shortages are thought to be limiting flyway populations.

Maintenance of current population levels in this Flyway depends upon a vigorous effort to preserve existing wetlands and restore former marsh in California's wintering grounds.

B. Populations of Concern

The most important coastal waterfowl species from a biological (numbers, impact on environment) and/or economic (hunting, birding) standpoint include Great Basin Canada goose; Pacific brant; pintail; American wigeon; green-winged teal; shoveler; canvasback; lesser and greater scaup; ruddy duck; bufflehead; common goldeneye; red-breasted merganser; and white-winged, black, and surf scoters.

These species contribute significantly to the hunting harvest and/or make up the large concentrations of birds of interest to nonconsumptive users. Other species present in significant numbers include whistling swans, redheads, mallards, cinnamon teals, Barrow's goldeneyes, and hooded and common mergansers. Oldsquaws and harlequin ducks use the coast in small numbers. The endangered Aleutian Canada goose also depends upon coastal habitat in spring and fall.

Most waterfowl flocks using coastal habitat are not confined to any specific area throughout the fall and winter. Birds move among the wetlands and bays along the coast, and between the coast and inland wetlands of the Central Valley in response to season and weather changes, water condition, and food availability. These movements are modified during years of unusually heavy precipitation or droughts. Coastal habitat takes on added significance during drought because the reduced habitat inland forces birds to the coastal environment. The additional carrying capacity of coastal wetlands during drought is unknown, but general observations indicate that more waterfowl use these areas in dry years. The continued loss of coastal wetlands may, therefore, play a vital role in the long-term maintenance of Pacific Flyway populations.

Many types of habitats are needed by the different species of waterfowl. The dabbling ducks utilize dry grain fields as well as salt, fresh, and brackish marshes in which to feed. Brant feed on eel grass beds in the coastal bays and estuaries. Diving ducks use the deep water of bays, lagoons, and freshwater lakes as well as salt and brackish marshes. Scoters remain offshore or use the large bays.

C. Relationship to Flyway Populations

Little quantitative waterfowl population data are available for California coastal wetlands. State and Federal biologists conduct mid-winter inventories only in Humboldt Bay, San Francisco Bay, and the coastal bays and lagoons of Marin and Sonoma counties (Bodega, Bolinas, Tomales, etc.). No biweekly surveys are conducted in these areas. The central and southern coastal wetlands are not inventoried regularly and only limited data are available. Bellrose (1976) provides data on most species. Information on waterfowl numbers has been obtained for many wetlands during the preparation of special coastal wetland reports produced by the California Department of Fish & Game (CDFG). Private citizens have kept records on several wetlands. Overall, the records of abundance of waterfowl using California coast habitat are incomplete.

California coastal wetlands provide wintering habitat for only about 3 to 5 percent of the Pacific Flyway's total waterfowl population during the mid-winter period (Table 1). Probably an equal or greater number of waterfowl migrate through coastal habitat to more southerly wintering grounds in the fall. Hundreds of thousands of shorebirds and other water related avifauna also winter in or pass through coastal wetlands. Most California coastal wetlands support larger numbers of wintering and breeding shorebirds and waders than waterfowl.

Mid-winter inventories for the 1973 to 1977 period (Table 1) recorded an average of 8.6 million waterfowl, of those species listed, wintering in the Pacific Flyway, including Mexico's west coast; of these, 200,000 ducks were found in the San Francisco, Humboldt, and Marin-Sonoma coastal Bay areas. This accounts for only about one percent of the Flyway's dabbling duck population recorded at that time. Coastal environments are significantly more important to diving ducks during the mid-winter period with 24 percent of the Flyway's population present. Goose use of coastal wetlands is insignificant during the winter period, with the exception of Aleutian Canada geese, Great Basin Canada geese, and pacific brant. Most of the Great Basin geese are found at the inland boundary of the coastal zone on reservoirs - not in tidal areas. The heaviest use by Aleutian Canada geese and pacific brant is during spring and fall migration. Swans are represented only by low numbers in the Humboldt Bay area and a few other north coast wetlands.

Mid-winter waterfowl inventory data do not represent peak or total coastal populations, nor do they reflect all species which use coastal habitat. Coastal wetlands are also used as migration staging areas by birds enroute to and from wintering grounds in the Central Valley, Mexico, and Central and South America.

Virtually 100 percent of the Pacific Flyway population of canvasbacks, brant, and Aleutian geese use coastal wetlands at some time during the fall, winter, and/or spring migration periods. Special counts of Aleutians are made at their fall and spring staging grounds on Castle Rock and Point St. George near Crescent City, California.

TABLE 1. MID-WINTER WATERFOWL INVENTORY DATA FOR PACIFIC FLYWAY AND SELECTED CALIFORNIA COAST WETLANDS 1973-1977

Species	Average Pacific Flyway Population	Average California Population	Average CA Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coast Bays [d/]
	[a/]	[b/]		[c/]		
Whistling Swan	44,600(2)	42,800(2)	800	800(100)	0	0
Great Basin Canada Goose	143,698(3)	38,381(13)	5,000	17(Tr)	36(Tr)	0
Pintail	3,950,300(Tr)	3,157,200(1)	28,000	7,000(25)	19,000(68)	2,000(7)
Mallard	1,468,300(Tr)	435,400(Tr)	1,620	470(29)	1,100(68)	50(3)
American Wigeon	807,800(3)	547,300(5)	29,600	17,450(59)	9,000(34)	3,150(1)
Northern Shoveler	711,800(2)	617,100(3)	15,660	200(1)	15,400(98)	60(1)
Green-winged Teal	336,300(Tr)	158,800(1)	1,800	800(44)	750(42)	250(14)
Gadwall	30,000(2)	17,900(3)	600	170(28)	400(67)	30(5)
Total Dabblers	7,304,500(1)	4,933,700(2)	77,280	26,090(34)	45,650(61)	5,540(4)
Canvasback	78,200(31)	60,600(40)	24,300	2,550(10)	21,000(86)	750(4)
Lesser/Greater Scaup	181,200(28)	57,000(90)	51,580	3,280(6)	44,000(85)	4,300(8)
Redhead	51,200(2)	1,300(63)	820	720(88)	100(12)	0
Ruddy Duck	110,100(22)	80,500(30)	23,900	5,300(22)	16,800(70)	1,800(8)
Total Divers	420,700(24)	199,400(50)	100,600	11,850(12)	81,900(81)	6,850(6)
Scoters	98,200(29)	28,570(100)	28,570	7,970(28)	14,600(51)	6,000(31)
Bufflehead	35,250(13)	5,700(80)	4,540	1,430(31)	340(7)	2,770(62)
Goldeneyes	41,590(1)	1,400(21)	300	2(Tr)	120(40)	180(60)
Mergansers	33,000(1)	4,750(9)	405	70(17)	325(80)	10(3)
Total Sea Ducks	208,040(16)	40,750(56)	33,815	9,470(28)	15,385(45)	8,960(27)
Total Ducks	7,933,240(3)	5,173,850(4)	211,695	47,410(22)	142,935(68)	21,350(10)
Coot	608,800(4)	427,400(5)	22,300	10,200(46)	8,300(37)	3,800(17)
Total Waterfowl	8,586,640(3)	5,644,050(4)	239,795	58,429(25)	151,271(64)	25,150(11)

a/ Coastal population percentage of Pacific Flyway
b/ Coastal population percentage of California Total
c/ Percentages of California Coast
d/ 1976 & 1977 only

Nearly the entire Pacific Flyway population can be found here at times. Prior to heavy winter rains which open up extensive inland habitat, about three quarters of the entire Pacific Flyway population of canvasbacks are located in the San Francisco Bay area. Approximately 95 percent of all Pacific brant use or pass through California coast bays, lagoons, or estuaries during their fall and/or spring migrations. The number of brant actually wintering in California waters has declined from an historical high of 40,000 to nearly zero. (Table 2). Most now winter in Mexico. A management plan has been developed by the Pacific Flyway Council which includes measures to increase the number of brant wintering in California.

Pintails, wigeons, shovelers, and green-winged teals use coastal habitat in larger numbers than reflected in the mid-winter counts of the three bay areas included in the survey. Although no exact estimate of their numbers are available, observations of CDFG biologists suggest that from 25 to 50 percent of the state population of these species can be found on the coast during the early stages of migration (August through September) when overall state populations are low. Also, during drought periods, the number of dabblers using coastal habitat increases dramatically, but this increase has not been quantified. The heaviest use is usually in the southern California wetlands. Bellrose (1976) indicates that about 30,000 pintails, and several thousand shovelers, and wigeons spend the winter in this part of the state. The magnitude of the early flights has not been documented quantitatively.

In the habitat description section of the Plan, what little population data are available for specific wetlands will be presented by coastal regions.

D. Population Trends of Species of Concern

The coast of California is of primary importance to several waterfowl species (especially divers, sea ducks, and brant) relative to their population levels in California, the Pacific Flyway, and the Continent. Recent trends in their population levels in California and overall status are presented below. Bellrose (1976) provided continental and some other population data, while Pacific Flyway trends were taken from mid-winter surveys unless indicated otherwise. Pacific Flyway and continental population figures include Mexico's West Coast. Coastal mid-winter population figures are derived from the 1973 to 1977 period.

Appendix B provides distribution and migration maps, plus a summary of population data and trends for the species listed below.

Table 2. Pacific Brant Annual Mid-Winter Survey

Year	Pacific Flyway 1/	Mexico	Washington-Oregon	California Total	Northern California 2/	Central California 3/	Southern California 4/
1954	132,002	86,316	16,936	28,750	7,500	12,700	8,550
1955	134,350	76,679	23,601	34,070	11,870	8,250	13,950
1956	109,240	52,743	17,987	38,510	19,010	12,025	7,475
1957	132,777	73,380	22,194	35,848	18,800	5,996	11,052
1958	125,862	71,305	27,997	26,560	11,300	6,705	8,555
1959	68,527	45,841	11,936	10,750	4,850	2,440	3,460
1960	136,224	114,187	18,266	3,771	21	1,900	1,850
1961	167,883	143,025	18,005	6,853	7	6,600	246
1962	170,236	118,645	28,081	23,510	0	14,850	8,660
1963	139,602	114,775	22,439	2,388	383	795	1,210
1964	187,220	142,698	36,169	8,353	2,683	3,110	2,560
1965	166,885	142,250	21,263	3,372	0	222	3,150
1966	159,871	133,614	22,973	3,284	0	174	3,110
1967	179,652	153,070	22,758	3,824	0	250	3,574
1968	154,340	136,000	16,611	1,729	0	131	1,598
1969	143,111	132,500	10,445	166	126	40	0
1970	141,681	131,595	9,879	207	47	160	0
1971	149,219	136,800	12,289	130	0	5	125
1972	124,775	119,400	5,375	0	0	0	0
1973	125,005	115,600	8,455	950	0	40	910
1974	129,671	123,300	5,901	470	0	470	0
1975	123,490	115,340	7,670	480	0	80	400
1976	122,045	112,056	9,309	680	15	150	515
1977	146,967	130,756	16,211	0	0	0	0

1/ Includes Mexico
2/ Humboldt Bay
3/ Marin-Sonoma County Bays (Tomales, Drakes, Bolinas, Bodega)
4/ Morro Bay, San Diego Bay

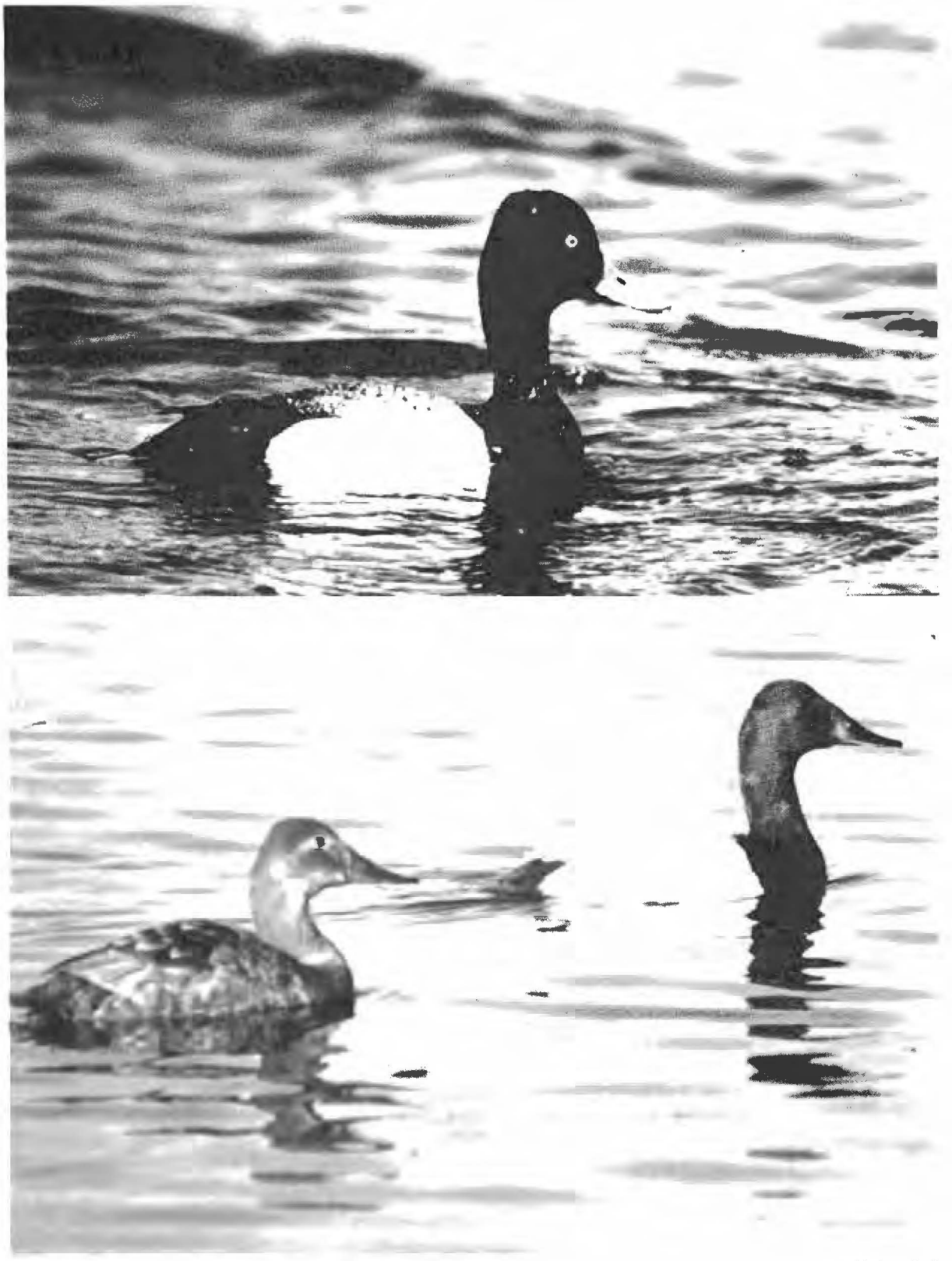
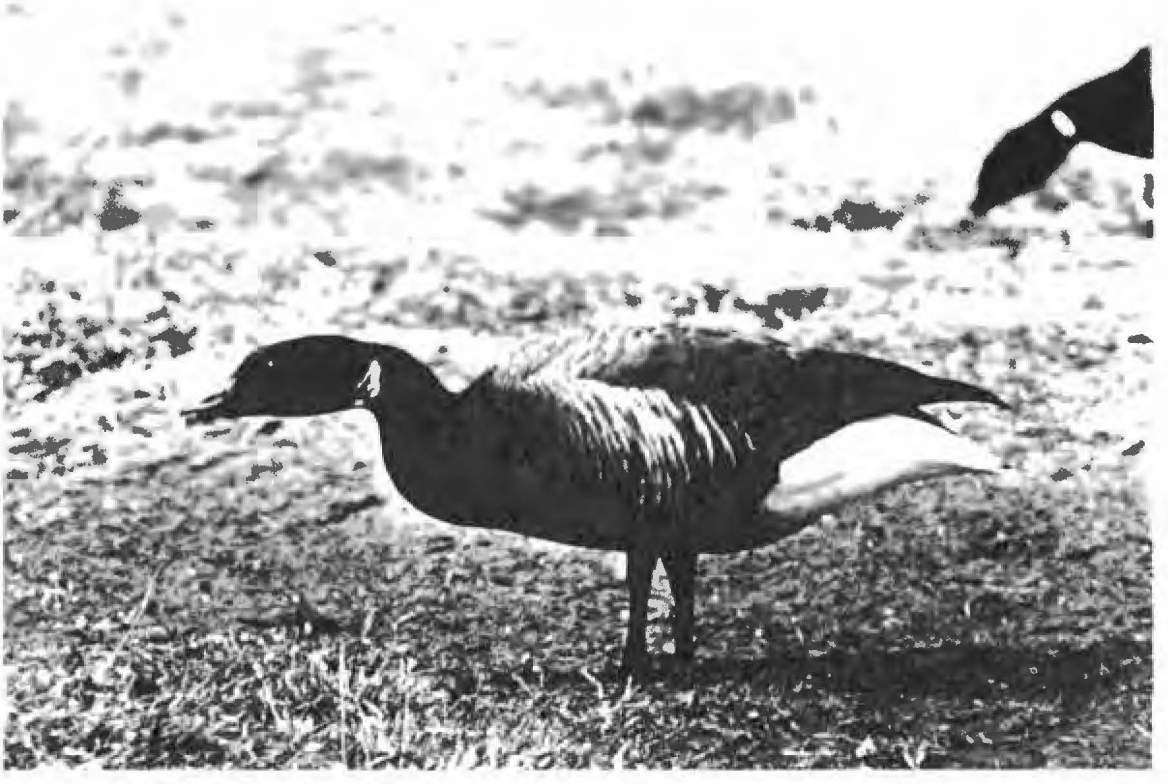


Photo 1. Canvasbacks and scaups are the most numerous diving duck species using coastal wetlands.

Photo 2. Management efforts are being implemented to increase the number of pacific brant wintering along the California coast.





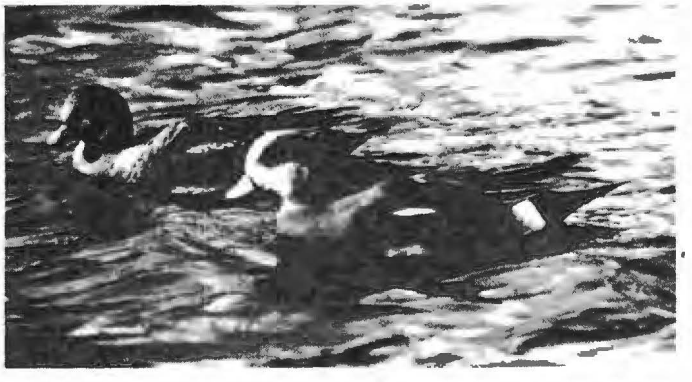




Photo 3. Pintails, wigeons, and shovelers are the most numerous dabbling ducks using California coastal wetlands.

1. Great Basin Canada Goose (Branta canadensis moffetti)

Great Basin Canada geese are found only in the Pacific Flyway with a wintering population size of 144,000. Over half of the Flyway's total winters in California, while only about 3.5 percent winters along the coast--primarily, San Diego County. The coast population in the San Diego area averages 5,000 birds and is increasing.

2. Pacific Brant (Branta bernicla)

The Pacific Flyway population of brant averages 140,000 during winter. This compares with an average of only 77,000 brant in the Atlantic Flyway. Only small numbers of Pacific brant currently winter on California's coast, but up to 40,000 have been supported in the past. As eelgrass is still plentiful, the decline is attributed to various forms of harassment on the favored bays. Management plans are being implemented in hopes of returning the brant to its former status in California.

3. American Wigeon (Anas americana)

The Pacific Flyway winter population of wigeon has averaged 808,000 and makes up about one-fourth of the continental winter population of about 3.5 million. Only about three percent (29,600) of the Pacific Flyway population is recorded in coastal habitat during the mid-winter inventories. About five percent of the State's mid-winter wigeon population is recorded in coastal habitat. Wigeon are present in many coastal wetlands not surveyed, so the total actually present is larger than recorded. Recent census data indicate that the wigeon population in this Flyway is stable.

4. Pintail (Anas acuta)

The Pacific Flyway winter population of pintails (3.9 million) makes up well over half of the continental population (7.0 million). Only a trace of this Flyway population is recorded in coastal habitat during the mid-winter surveys, and less than one percent of the pintails found in California in the winter are recorded in coastal habitat. Large numbers of this species use the coast in areas not surveyed and during spring and fall migrations. Census data indicate an increasing population of pintails in California.

5. Shoveler (Anas clypeata)

Over one-third (712,000) of the continental shoveler population

(2.0 million) is present in the Pacific Flyway. Most of these spend the winter in California, but only about two percent of the Flyway total and three percent of the California total are recorded in coastal habitat during the mid-winter surveys. Shovelers are present in large numbers in wetlands not surveyed. Census data indicate an increasing Flyway population of shovelers.

6. Green-winged Teal (Anas crecca carolinensis)

The Pacific Flyway winter population of green-winged teals (336,000) makes up about one-fifth of the continental winter population (about 2 million). Mid-winter inventories show that less than one percent of the Flyway population and only one percent of the state total uses California coastal habitat. Census data indicate stable population levels in this Flyway.

7. Canvasback (Aythya valisineria)

One-third (78,200) of the Continental Canvasback population (290,000) is found in the Pacific Flyway. California winters 77 percent (60,600) of this Flyway total. The average number of canvasbacks recorded in coastal habitat in the mid-winter period (24,300) is 31 percent of the Flyway and 40 percent of the State total. However, the entire California population can be found in the coastal areas at some time. Large populations are found inland only after heavy winter rains increase habitat in flood bypasses (leveed channels which divert flood waters around urban & agricultural areas). Census data indicate large population level fluctuations, but recent increases in numbers have occurred.

8. Lesser Scaup (Aythya affinis)

Bellrose (1976) attributes a population of 200,000 lesser scaup to the Pacific Flyway, which compares with a continental population of 1,000,000. Populations recorded during the mid-winter surveys in this Flyway have averaged 180,000 for lesser and greater scaup combined. About one-fourth (48,500) of the Flyway's lesser scaup are found in California, with most of these--38,500--recorded in coastal habitat. Birds are present outside of surveyed wetlands as well. Census data indicate a stable population level of lesser scaup.

9. Greater Scaup (Aythya marila mariloides)

The Pacific Flyway population of greater scaup (55,000) makes up 17 percent of the continental population (320,000).

Of these, 36,000, about two-thirds, winter in California coastal wetlands (Bellrose, 1976) mostly in San Francisco Bay. Census data indicate a stable population of greater scaup.

10. Ruddy Duck (Oxyura jamaicensis rubida)

The Pacific Flyway population of ruddy ducks during the mid-winter inventories has averaged 110,000 in recent years and makes up one-fifth of the continental population (500,000). Well over two-thirds of the Flyway's ruddies winter in California, and about 22 percent (23,900) of the Flyway total is recorded in coastal habitats. Census data indicate a stable Flyway population.

11. White-Winged Scoter (Melanitta fusca deglandi)

Annual mid-winter inventories record about 39,200 white-winged scoters wintering along the Pacific coast, including southeast Alaska. Another 250,000 winter in the Aleutians (Bellrose, 1976). This total is about 40 to 80 percent of the estimated mid-winter continental population (350,000 to 700,000). Of these, 7,700 winter along the coast of California. Census information indicates a stable population of white-wings in the Pacific Flyway.

12. Surf Scoter (Melanitta perspicillata)

The Pacific Flyway mid-winter population of surf scoters (100,000) makes up three-fourths of the continental population (130,000). California populations average 19,200. It is the most abundant of the scoter species in California. Surf scoter populations are stable.

13. Black scoter (Melanitta nigra americana)

Mid-winter populations of black scoters recorded in the Pacific Flyway (5,000) make up about 20 percent of the continental total of 27,000. It is generally acknowledged that these counts are conservative. An estimated 250,000 black scoters winter in the Aleutians. California populations are small, with about 900 an average winter-count. Black scoter populations are stable in the Flyway.

14. Bufflehead (Bucephala albeola)

Pacific Flyway buffleheads recorded during mid-winter surveys (35,000) make up 52 percent of the continental total (67,000). California accounts for 5,700 buffleheads in the winter,

80 percent of which are found in coastal habitats (4,500). About 16,000 winter in Alaska and British Columbia coastal habitat. Mid-winter survey data are conservative for this species but indicate stable population levels.

15. Common Goldeneye (Bucephala clangula americana)

The Pacific Flyway winter population of 110,000 common goldeneyes is 50 percent of the continental total of 220,000 (Bellrose 1976). Mid-winter survey data are conservative for this species. Recent surveys have shown 42,000 in the Pacific Flyway, with 1,400 in California and 300 of these in coastal habitat. But since most of the coastal habitat is not surveyed, Bellrose's total estimate of 3,800 for coastal California is probably more accurate. Census data indicate stable population levels of this species. Only small numbers of Barrow's goldeneye (B. islandica) are present in California in winter.

16. Red-breasted Merganser (Mergus serrator)

Because mid-winter surveys do not inventory most of the coastal habitat, and because merganser species are not separated in the surveys, Bellrose (1976) calculations are used for population data. The Pacific Flyway winters 6,000 of the continent's 60,000 red-breasted mergansers; of these, 17 percent (1,000) winter in California coastal habitat. Census data are conservative, but populations appear to be stable.

17. Other Species

Whistling swans (Cygnus columbianus), cinnamon teals (Anas cyanoptera), gadwalls (A. strepera), mallards (A. platyrhynchos), redheads (Aythya americana), common mergansers (Mergus merganser americanus), hooded mergansers (Mergus cucullatus), oldsquaws (Clangula hyemalis), and harlequins (Histrionicus histrionicus) are present and recorded in population surveys, Audubon Christmas counts, and periodic observations in coastal habitat. However, coastal population levels of these species are low, making up only small fractions of the continental, Pacific Flyway, and California populations. No trends in the population levels of these species have been determined in California coastal wetlands.

E. Unique Waterfowl Species/Populations

One waterfowl subspecies using California coastal habitat is considered unique because of its precarious status. The Aleutian Canada goose (Branta canadensis leucopareia) has been designated as an endangered species by the FWS because of its restricted

breeding range and low numbers. It currently nests only on Buldir Island in the Aleutian Islands of Alaska. The historic breeding range was more extensive, but Russian, and later American trappers introduced Arctic foxes to the nesting islands. This resulted in elimination of the geese, except on Buldir.

Extensive recovery efforts are underway to increase goose population levels by removal of foxes from former nesting islands, protection of known staging and wintering areas, propagation and release of captive birds, and protection through hunting closures. All of Del Norte and Humboldt Counties (North Coast Region) and portions of California's Central Valley have been closed to hunting of all Canada geese at varying times to protect Aleutians. The major coastal use areas are Castle Rock, Point St. George, and Lakes Earl and Talawa in the Crescent City area. This use occurs in fall and spring. No Aleutians are known to have ever spent the mid-winter period on California's coast. Up to 1,600 of these birds have been counted at one time on the north coast during fall and spring migration.

When breeding populations are established on several more Aleutian Islands and a sustaining population is achieved, this subspecies will be transferred to the threatened category and eventually delisted.

Photo 4. Aleutian Canada goose



California Least Tern





California Clapper Rail

III. Unique and/or Endangered Species other than Waterfowl

III. UNIQUE OR ENDANGERED SPECIES OTHER THAN WATERFOWL

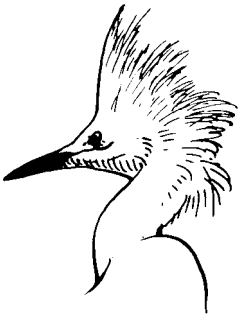
A. Rare, Threatened and Endangered

In addition to the Aleutian Canada goose, the U.S. Government has designated 11 animal species which use coastal habitat as endangered. California has also listed 12 species as either endangered or rare. Federally designated endangered species include the American peregrine falcon (Falco peregrinus anatum), bald eagle (Haliaeetus leucocephalus), California least tern (Sterna albifrons browni), California clapper rail (Rallus longirostris obsoletus), light-footed clapper rail (Rallus longirostris levipes), California brown pelican (Pelecanus occidentalis californianus), Santa Barbara sparrow (Melospiza meloidia graminea), salt marsh harvest mouse (Reithrodontomys raviventris), Morro Bay kangaroo rat (Dipodomys heermanni morroensis), Santa Cruz long-toed salamander (Ambystoma macraodactylus croceum), and San Francisco garter snake (Thamnophis sirtalis tetrataenia). The state has classified the Morro Bay kangaroo rat, salt marsh harvest mouse, American peregrine falcon, bald eagle, California brown pelican, California least tern, California and light-footed clapper rails, Belding's savannah sparrow (Passerculus sandwichensis beldingi), San Francisco garter snake, and the Santa Cruz long-toed salamander as endangered. Additionally, the California black rail (Laterallus jamaicensis coturniculus) has been classed as a rare species by the state.

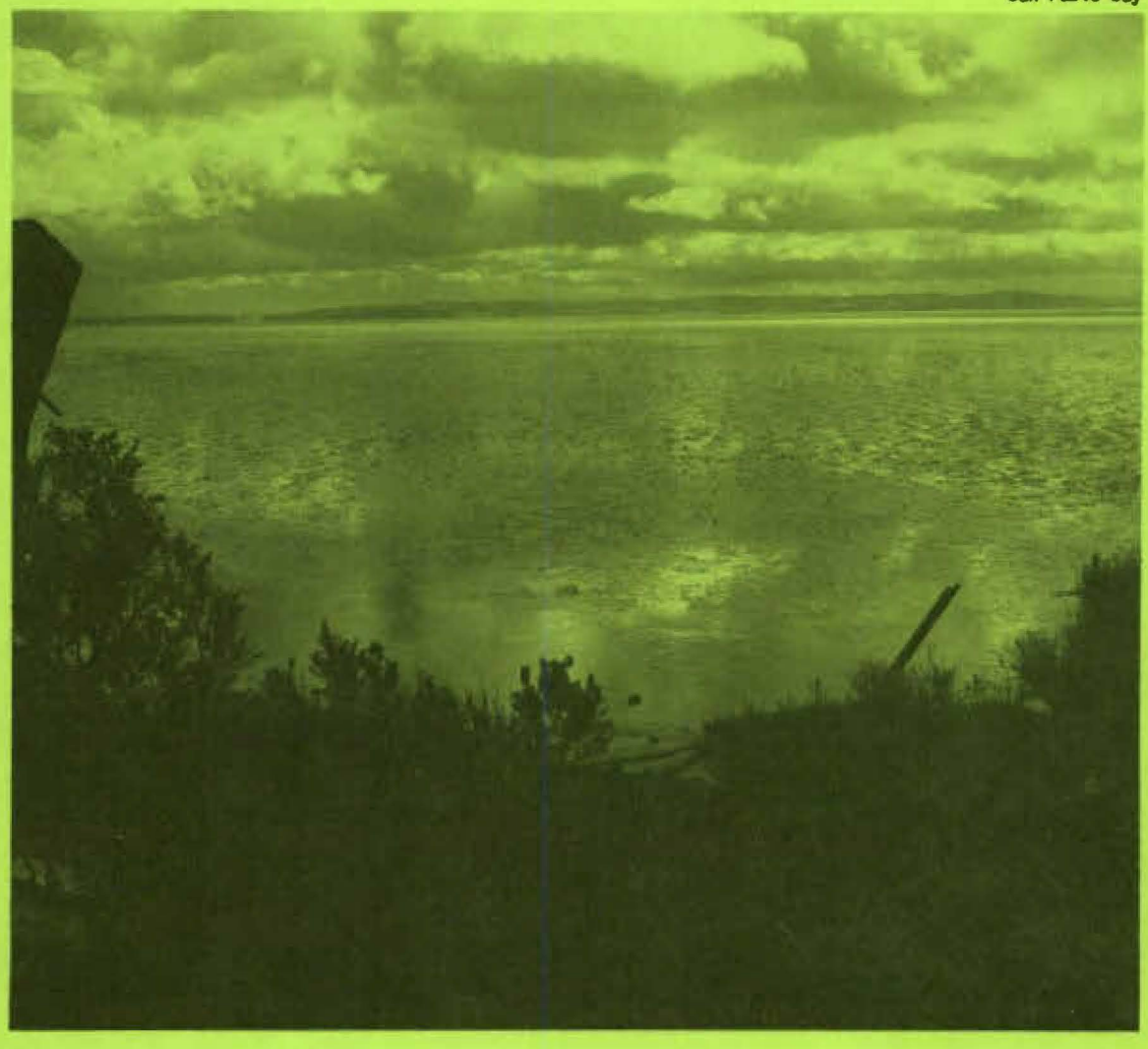
Coastal wetland preservation will be required to maintain many of the species listed above. The bald eagle and peregrine falcon use coastal wetlands for feeding during the winter, whereas the other species maintain resident and/or nesting populations.

B. Unique

Many unique, but not endangered, water and upland birds of high recognition value are associated with remaining wetlands of California's coastal zone. These include three species of egrets; several grebe and heron species; about 30 species of shorebirds; and several gull, tern and other water bird species, and raptors such as white-tailed kites. Indeed, California's coastal wetlands are most noted for their large populations of avifauna other than waterfowl--especially, shorebirds.



San Pablo Bay



IV. Habitat Description

IV. HABITAT DESCRIPTION

A. Location, Description, Acreage and Waterfowl Use of Wetland Habitat of Greatest Importance

Each of the California Coastal Regions has unique wetland areas, with varying proportions in federal, state, and private ownership. Each has different water regimes and marsh management systems. Truly natural, unmanged tidal marsh is present along the coast in many areas; but diked tidelands and managed wetlands (including salt production ponds) make up a large share of remaining habitat. Many wetlands have been destroyed by diking, offering ample opportunity for marsh restoration.

Descriptions of coastal waterfowl habitat by Region are presented below. Figure 2 shows the location of state and federal WMAs, ERs, and NWRs in each Coastal Region. Tables 1 and 2 should be referred to for detailed comparative waterfowl population data. Table 3 lists all wetlands, with their sizes, present along the coast in each Region. Table 4 presents comparative data on federal and state wetland habitat acreage by region.

1. North Coast Region (Figure 3)

A. Description

The North Coast Region is composed of Del Norte, Humboldt, and Mendocino Counties and accounts for one-fourth of the California coastline. This region is remote and only sparsely populated, with about 170,000 residents in the three counties. Forest products, fisheries, agriculture, and tourism support the ecomony of the region.

Most North Coast wetlands are small, but several large estuaries and freshwater lagoons are important to waterfowl, including the Smith and Eel River deltas, Lakes Earl and Talawa, Humboldt Bay, and Big and Stone Lagoons. The numerous other small creek mouths provide habitat used by only low numbers of waterfowl. While a large amount of natural tidal marsh is still present, much of the habitat has been diked for farming and grazing--especially in the Humboldt Bay, and the Eel and Smith River Deltas.

Forests of coast redwood and Douglas fir cover most of the upper drainages of all north coast wetlands. North coast wetland habitat is present in wide, low coastal plains or at the base of coast range foothills which extend to the Pacific Ocean. This latter geologic characteristic accounts for the small size of most north coast estuaries. Major habitat types below the forests include riparian woodland,

NORTH COAST REGION

1. Smith River Delta
2. Lakes Earl and Talawa
3. Dead Lake
4. Klamath River Estuary
5. Redwood Creek Estuary
6. Freshwater Lagoon
7. Stone Lagoon
8. Dry Lagoon
9. Big Lagoon
10. Mad River Estuary
11. Mad River Slough
12. Humboldt Bay
13. Eel River Delta
14. Mattole River Estuary
15. Bear Harbor
16. Jackass Creek Estuary
17. Usal Creek Estuary
18. Cottoneva Creek Estuary
19. Hardy Creek Estuary
20. Ten Mile River Estuary
21. Inglenook Creek Estuary
22. Sandhill Lake
23. Lake Cleone
24. Pudding Creek Estuary
25. Noyo River Estuary
26. Caspar Creek Estuary
27. Big River Estuary
28. Little River Estuary
29. Albion River Estuary
30. Big Salmon Creek Estuary
31. Navarro River Estuary
32. Greenwood Creek Estuary
33. Elk Creek Estuary
34. Alder Creek Estuary
35. Laguna Creek Marsh
36. Brush Creek Estuary
37. Hunter's Lagoon
38. Garcia River Estuary
39. Hathaway Creek
40. Gualala River Estuary

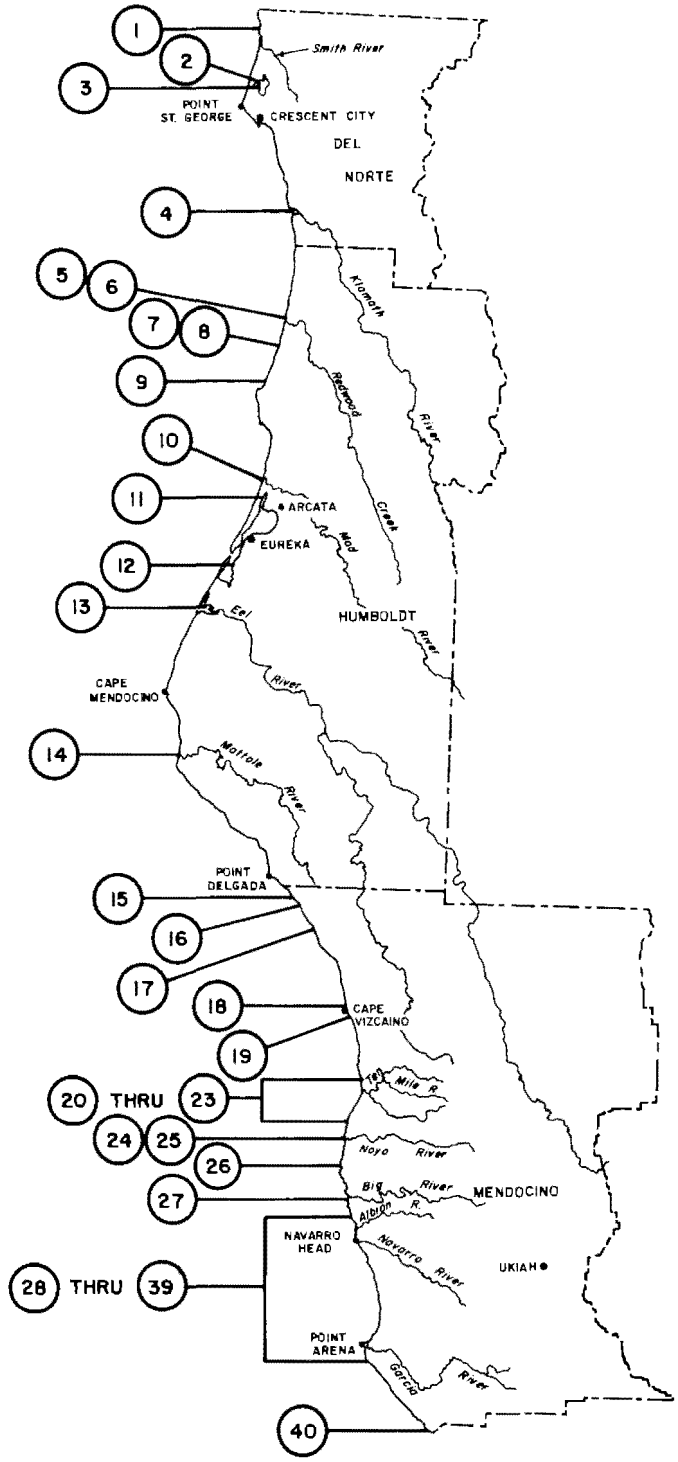


Figure 3. North Coast Region

Table 3.

Complete List of Coastal Wetlands. This listing includes most estuaries, lagoons, and freshwater ponds present within the California coastal zone having at least some value to wildlife. The areas are arranged north to south.

AREA	ACRES	
NORTH COAST REGION		
Smith River Delta	4,975	
Lakes Earl and Talawa	2,560	
Dead Lake	50±	
Klamath River Estuary	400	
Redwood Creek Estuary	80	
Freshwater Lagoon	245	
Stone Lagoon	520	
Dry Lagoon	80	
Big Lagoon	1,470	
Mad River Estuary	100	
Mad River Slough	450	
Humboldt Bay	16,000	
Eel River Delta	8,700	
Mattole River Estuary	175	
Bear Harbor	2	
Jackass Creek Estuary	3	
Usal Creek Estuary	10	
Cottoneva Creek Estuary	14	
Hardy Creek Estuary	6	
Ten Mile River Estuary	170	
Inglenook Creek Estuary	5	
Sandhill Lake	25	
Lake Cleone	32	
Pudding Creek Estuary	58	
Noyo River Estuary	82	
Casper Creek Estuary	13	
Big River Estuary	150	
Little River Estuary	2	
Albion River Estuary	145	
Big Salmon Creek Estuary	9	
Navarro River Estuary	126	
Greenwood Creek Estuary	14	
Elk Creek Estuary	17	
Alder Creek Estuary	9	
Laguna Creek Marsh	20	
Brush Creek Estuary	2	
Hunter's Lagoon	86	
Garcia River Estuary	200	
Hathaway Creek	80	
Gualala River Estuary	100	
Total	37,185	(22%)

AREA	ACRES	
NORTH CENTRAL COAST REGION		
Russian River Estuary	400	
Salmon Creek Lagoon	40	
Bodgega Harbor	935	
Estero Americano	340	
Estero de San Antonio	155	
Tomales Bay	9,000	
Point Reyes Ponds & Bays		
Abbott's Lagoon	170	
D Ranch Pond	25	
Drake's/Limantour Esteros	2,070	
Wildcat Lake	9	
Ocean Lake	7	
Crystal Lake	17	
Pelican Lake	21	
Bass Lake	14	
Bolinas Lagoon	1,400	
Rodeo Lagoon	38	
Total	14,641	(9%)
SAN FRANCISCO BAY AREA		
Petaluma River Marsh	3,800	
Gallinas Creek Marsh	850	
Corte Madera Marsh	200	
San Rafael Creek Marsh	200	
San Pedro Hill Marsh	50	
Novato Creek Marsh	130	
Napa Marshes	10,000	
San Pablo Bay	35,000	
South Hampton Bay	300	
North Richmond Marsh	400	
South San Francisco Bay	43,000	
Total	93,930	(55%)

Table 3. (cont'd)

AREA	ACRES	AREA	ACRES
CENTRAL COAST REGION		SOUTH CENTRAL COAST REGION	
Princeton Marsh	30	Arroyo de la Cruz	40
Tunitas Creek Estuary	11	Arroyo del Corral	40
San Gregorio Creek Estuary	6	Arroyo Laguna	3
Pompanio Creek Estuary	1	Little Pico Creek Estuary	3
Pescadero Marsh	520	Pico Creek Estuary	5
Lake Lucerne	80	San Simeon Creek Estuary	40
Gazos Creek Estuary	2	Santa Rosa Creek Estuary	40
Cascade Creek Estuary	9	Morro Bay	2,600
Green Oaks Creek Estuary	31	San Luis Obispo Creek Estuary	23
Waddell Creek Estuary	50	Pismo Marsh	90
Scott Creek Estuary	100	Oceano Lagoon	105
Laguna Creek Estuary	25	Dune Lakes	860
Baldwin Creek Estuary	8	Oso Flaco Lake	230
Wilder Creek Estuary	8	Santa Maria River Estuary	315
Terrace Point Pond	4	Shuman Creek Estuary	2
San Lorenzo River Estuary	37	San Antonio Creek Estuary	3
Woods Lagoon	50	Santa Ynez River Estuary	400
Schwann's Lagoon	20	Canada Honda Creek Estuary	1
Corcoran Lagoon	26	Jalama Creek Estuary	2
Moran Lake	4	Devereux Lagoon	45
Soquel Creek Estuary	6	Goleta Slough	360
Aptos Creek Estuary	4	Carpenteria Marsh	230
Watsonville Slough-Pajaro River Estuary	150	Ventura River Estuary	10
McClusky Slough	250	Santa Clara River Estuary	60
Bennett-Elkhorn Slough	2,500	McGrath Lake	40
Moro Cojo Slough	150	Mugu Lagoon-Calleguas	2,355
Old Salinas River	50	Total	7,902 (5%)
Salinas River Estuary	300		
Trembladero Slough	10		
Marina Ponds	5	SOUTH COAST REGION	
Laguna Del Rey	40	Malibu Lagoon	7
Del Monte Lake	6	Ballona Creek Estuary	70
El Estero Lake	15	Anaheim Bay (Seal Beach)	1,000
Carmel River Estuary	42	Bolsa Chica	1,100
San Jose Creek Estuary	5	Santa Ana River Mouth	20
Little Sur River Estuary	8	Upper Newport Bay	1,000
Big Sur River Estuary	17	San Joaquin Marsh	150
Total	4,580 (3%)	Total	3,347 (2%)

Table 3. (cont'd)

AREA	ACRES	
SAN DIEGO REGION		
San Mateo Creek Estuary	20	
Los Flores Creek	20	
Santa Marguerita River Estuary	300	
San Luis Rey River Estuary-Whelan Lake	160	
Loma Alta Creek Estuary	15	
Buena Vista Lagoon	200	
Agua Hedionda Lagoon	340	
Batiquitos Lagoon	600	
San Elijo Lagoon	570	
San Diequito Lagoon	150	
Los Penasquitos Lagoon	400	
Mission Bay	1,720	
San Diego Flood Channel & River	320	
South San Diego Bay	2,400	
Tijuana Slough	1,100	
Total	8,315	(6%)
GRAND TOTAL	169,900	

TABLE 4. FEDERAL & STATE NWRs, WMAs, ERs, PARKS AND OTHER WETLAND HOLDINGS ALONG THE COAST OF CALIFORNIA (Includes Fee Ownership, Leases, and Cooperative Agreements)

	FEDERAL		STATE	
	NWR (Acres)	Other (Acres)	WMA/ER (Acres)	Other (Acres)
North Coast	Humboldt Bay (130)	Redwood Nat'l. Park (80)	Eel River WMA (203) Big Lagoon ER (1,470)	State Parks: Freshwater Lagoon (245) Stone Lagoon (520) Dry Lagoon (80) Lake Cleone (32) City of Eureka (4,600)
North Central Coast	None	Point Reyes Nat'l Seashore (2,333) Rodeo Lagoon-Army (38)	Upper Tomales Bay ER (542)	None
San Francisco Bay Area	SF Bay (15,388) San Pablo (11,711)	Skaggs Isl-Navy (3,627) Hamilton AFB (800)	Napa River ER (73) Coon Island ER (250) San Pablo Bay WMA (10,000) Bair Island ER (800) Redwood Shores ER (132) Napa WMA (3,000)	Napa County (667) City of Vallejo (344) State Park: South Hampton Bay (300)
Central Coast	Ellicot Slough(137)	None	Moro Cojo Slough (11) Santa Cruz Salamander (43)	State Park: Pescadero (156)
South Central Coast	None	Vandenberg AFB (407) Mugu Lagoon-Navy (1,735)	Pismo Marsh ER (50)	State Parks: Oceano Lagoon (105) Morro Bay (300) City of Morro Bay (300) University of Calif (230)
South Coast	Seal Beach (977)	None	Upper Newport Bay ER (741) Bolsa Chica ER (557)	None
San Diego Coast	None	Camp Pendleton-Marines (360) Tijuana Slough-Navy(280)	Buena Vista ER (192) San Elijo ER (268) Batiquitos ER (135)	Ocean City (40) San Diego River Floodway (320) San Diego Unified Port District (2,400)

sand dunes, salt marsh, freshwater marsh and sloughs, tidal flats, river channels, and open water. Extensive eelgrass beds important to pacific brant are present in Humboldt Bay.

Most habitat is privately owned. Humboldt Bay NWR is just being purchased, and the CDFG does not operate any intensively managed wildlife areas at present. The state claims many of the tideland areas, and much of the habitat is in state parks.

The climate of the North Coast Region is rainy and temperate. Annual rainfall ranges from 40 to 120 inches and falls between October and May. Freezing temperatures are infrequent, and fog is a common occurrence. Winter storms may be severe.

B. Habitat Acreage

About 37,200 acres of wetland habitat are present in the North Coast Region of which about 35,800 are of some value to waterfowl (Table 5). The CDFG Eel River and Big Lagoon WMAs encompass 200 and 1470 acres, respectively. Other federal and state lands total about 5500 acres of wetlands. Only 130 acres of Humboldt Bay NWR have been acquired; an ultimate 8000 acres is proposed for acquisition. These habitat acreage figures include tidal marsh, lagoons, open bays and freshwater marsh, and represent about 25 percent of the coastal wetlands in California. The size of individual wetlands ranges from about 30 to 16,000 acres.

C. Waterfowl Use

Most of the North Coast Region waterfowl use is concentrated in the Lake Earl and Talawa-Smith River Delta and the Humboldt Bay-Eel River Delta areas. There are 22 species of waterfowl known to occur regularly within the North Coast Region wetlands. The most numerous species in the Lake Earl and Talawa area are wigeons, ruddys, pintails, canvasbacks, greater scaups and mallards (Table 6). Greater and lesser scaups are most numerous in the Smith River Delta area. Three scoter species, canvasbacks, redheads, buffleheads, ring-necked ducks, goldeneyes, and ruddy ducks are also recorded there. Geese, excluding brant, are rare along the North Coast and include the Aleutian Canada goose (Lake Earl-Crescent City area). Whistling swans use the area in limited numbers. Waterfowl and other water bird average annual use-day data are presented below for representative north coast wetlands:

Photo 5. South Humboldt Bay wetlands





Photo 6. Lake Earl is important for canvasbacks.

Photo 7. Smith River Estuary does not provide extensive waterfowl habitat.





Photo 8. Eel grass is the mainstay of pacific brant.

Table 5.

Coastal Wetlands With Some Waterfowl Value. Wetlands which were known to have waterfowl resource values were selected from the comprehensive list (Table 4). This was a first cut at isolating wetlands which could be preserved, based on their waterfowl value. No attempt was made to exclude wetlands already protected, those being acquired with other funding sources, or those more important to non-waterfowl and/or endangered species.

AREA	ACRES		AREA	ACRES	
NORTH COAST REGION			CENTRAL COAST		
Smith River Delta	4,975		Pescadero Marsh	520	
Lakes Earl & Talawa	2,560		Lake Lucerne	80	
Freshwater Lagoon	245		Watsonville Slough-Pajaro River	150	
Stone Lagoon	520		McClusky Slough	250	
Dry Lagoon	80		Bennett-Elkhorn Sloughs	2,500	
Big Lagoon	1,470		Old Salinas River	50	
Mad River Slough	450		Salinas River Estuary	300	
Humboldt Bay	16,000		Total	3,850	(2%)
Eel River Delta	8,700				
Ten Mile River Estuary	170		SOUTH CENTRAL COAST REGION		
Big River Estuary	150		Morro Bay	2,600	
Navarro River Estuary	126		Dune Lakes	860	
Laguna Creek Marsh	20		Oso Flaco	230	
Hunter's Lagoon	86		Santa Maria River Estuary	315	
Garcia River Estuary	200		Goleta Slough	360	
Hathaway Creek Marsh	80		Carpenteria Marsh	230	
Total	35,832	(22%)	Mugu Lagoon-Calleguas	2,355	
			Total	6,950	(4%)
NORTH CENTRAL COAST			SOUTH COAST REGION		
Bodega Bay	935		Anaheim Bay	1,000	
Estero Americano	340		Bolsa Chica	1,100	
Estero de San Antonio	155		Upper Newport Bay	1,100	
Tomales Bay	9,000		Total	3,100	(2%)
Point Reyes Ponds & Bays	2,333				
Bolinas Lagoon	1,400				
Total	14,163	(9%)	SAN DIEGO REGION		
			Santa Marguerita River Estuary	300	
			San Luis Rey River-Whelan Lake	160	plus
SAN FRANCISCO BAY AREA			Buena Vista Lagoon	200	
Petaluma Marshes	3,800		Agua Hedionda Lagoon	340	
Gallinas Creek Marsh	850		Batiquitos Lagoon	600	
Corte Madera Marsh	300		San Elijo Lagoon	570	
San Rafael Creek Marsh	200		San Diequito Lagoon	150	
San Pedro Hill Marsh	50		Los Penasquitos Lagoon	400	
Novato Creek Marsh	130		San Diego River & Flood Channel	320	
Napa Marsh-San Pablo Bay	45,000		South San Diego Bay	2,400	
North Richmond Marsh	400		Tijuana Slough	1,100	
South SF Bay	43,000		Total	6,548	(4%)
Total	93,630	(57%)			
			GRAND TOTAL	164,073	

TABLE 6. WATERFOWL CENSUS - NORTH COAST REGION. AVERAGE MONTHLY POPULATIONS (CDFG Coastal Wetland Series)

HUMBOLDT BAY (1967 - 1970)

Species	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
Swan	0	0	0	0	0	0	0	67	0	0	0	0
Black brant	0	1	130	4	1,093	19	6	795	12,039	21,208	4,071	4
Dabblers	72	2,281	5,591	9,001	11,163	14,962	15,699	15,131	6,990	4,545	413	60
Divers*	10	127	47	1,036	2,831	3,903	3,817	9,269	6,268	2,091	214	18
Sea Ducks**	300	873	635	1,795	6,412	3,150	5,997	6,744	3,024	3,148	1,655	447

EEL RIVER DELTA (1967 - 1970)

Swan	0	0	0	0	0	107	530	364	41	0	0	0
Black brant	0	0	0	15	1	0	0	0	7	1	0	0
Dabblers	118	1,711	2,092	3,206	1,720	6,910	2,295	12,364	5,121	2,823	37	18
Divers	1	5	0	5	30	41	22	61	60	52	35	1
Sea Ducks	25	7	33	71	146	87	47	115	69	150	19	10

LAKE EARL (1970 - 1973)

Swan	0	0	0	0	14	75	75	54	0	0	0	0
Dabblers	50	328	1,204	4,722	3,339	17,499	1,130	1,122	271	261	41	22
Divers	23	103	84	505	4,593	11,334	5,276	1,619	721	115	380	6
Sea Ducks	0	30	50	1	252	116	155	458	96	309	244	30

* Canvasback, Redhead, Scaup, Ruddy
** Scoters, Goldeneye, Bufflehead, Merganser

	Waterfowl	Shorebirds, Waders, Other
Lake Earl-Talawa	1.8 million	1.235 million
Smith River	170,000	132,000
Humboldt Bay	5.8 million	7.763 million
Eel River	1.4 million	1.315 million
Stone Lagoon	670,000	100,000
Dry Lagoon	166,000	90,000
Big Lagoon	235,000	395,000
Freshwater Lagoon	15,000	22,000
Mad River Estuary	15,000	142,000

Wigeon make up 50 percent of the waterfowl using Humboldt Bay, in winter. Pintails and scaups are next in abundance, with large numbers of green-winged teals and shovelers occasionally recorded. Pintails are more numerous in September and October during migration than in winter.

This part of the North Coast is very important to diving and sea ducks--including scoters, scaups, canvasbacks, buffleheads, and ruddy ducks. Scoters occur in the greatest numbers, followed by scaups (greaters are more abundant than lessers). Red-breasted, common, and hooded mergansers are present in winter, and the common nests locally. The red-breasted and common are most abundant.

Humboldt Bay is an important migration staging area for Pacific brant. Large wintering populations of brant used the Bay area until the early 1960s. Efforts are being implemented to reduce disturbance factors thought to be responsible for the decline in wintering numbers of brant. Spring populations may reach 40,000 in the general vicinity of Humboldt Bay. Total average annual brant use-days have averaged 1.2 million in recent years. Only a few Aleutian Canada geese have been recorded in the Humboldt Bay area.

The North and South Bays support different numbers and species of waterfowl. North Bay supports 70 percent of the duck use, while South Bay provides habitat for about 90 percent of the brant use. Shorebird and other water bird use exceeds waterfowl use in the Humboldt Bay area.

The Eel River Delta supports a large population of waterfowl. Bird use-day data indicate that the area is more important to waterfowl than to shorebirds. Brant do not normally use the Eel River Delta to any great extent; but the Delta is important during periods of low eelgrass production, when use of Delta pasture lands is recorded. Swans make

limited use of the Delta. The most common ducks are pintails, wigeons, cinnamon teals, and shovelers--with the heaviest use recorded in October, December, February, and March (Table 6). Small numbers of canvasbacks, scaups, buffleheads, scoters, and mergansers also use the Eel River Delta.

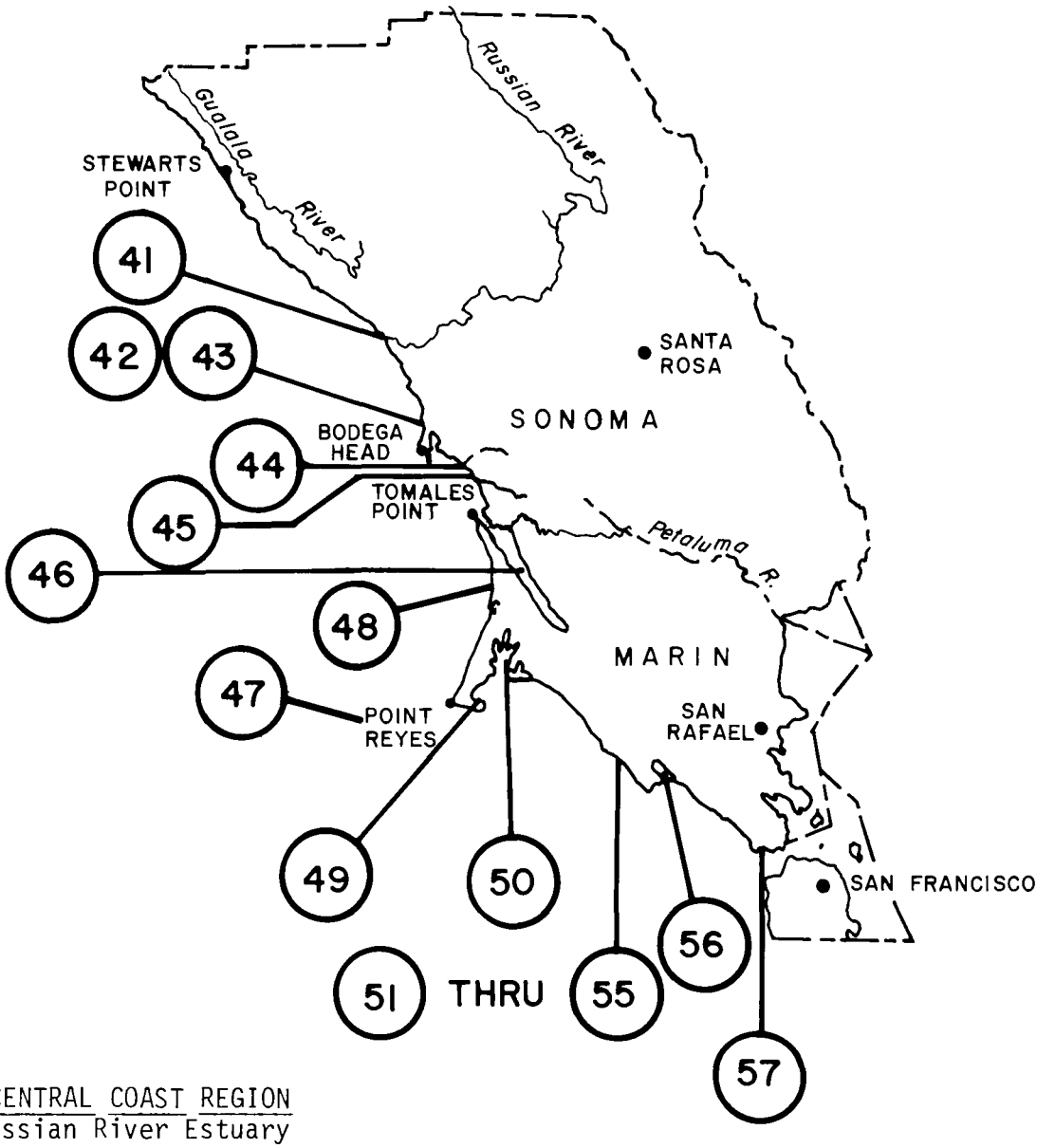
Waterfowl use-day data for the more numerous small estuaries along the North Coast have not been recorded in many cases. Based on the much smaller size of these areas and the type of habitat present, it must be inferred that their contribution to the support of waterfowl is likewise substantially less than the Humboldt Bay-Eel River Delta and the Lake Earl & Talawa-Smith River Delta areas. However, cumulatively these small areas may be important to many waterfowl species which are lower in number--such as goldeneyes, mergansers, and buffleheads. Likewise, scoters may use the offshore areas. Available information on waterfowl use for these areas is discussed below.

Over 300 ducks have been counted on the Klamath River estuary, but in general waterfowl use is low because of the lack of suitable wetland habitat. The Mad River estuary has only limited numbers of waterfowl. The Ten Mile, Big and Albion River estuaries and marsh have good habitat, but fall and winter use data are not available. A limited spring observation (one count) recorded only about 40 ducks on the Ten Mile River estuary; about 20 ducks on the Big River estuary, and about 70 ducks--including one oldsquaw--on the Albion River estuary. Brant have been recorded on the Big River estuary. The Garcia River estuary-Hathaway Creek Marsh area is good habitat. Over 500 swans were recorded in the area, as well as 150 ducks, during a recent February count. Many of the smaller areas supported surf scoters, red-breasted mergansers, goldeneyes, buffleheads, and ruddy ducks in numbers rarely exceeding 25-30 during this count. Waterfowl use of the Gualala and Mattole Rivers is low.

2. North Central Coast region (Figure 4).

A. Description

The North Central Coast Region encompasses about 140 miles of coastline in Sonoma, Marin, and San Francisco Counties. This region includes some of the most rugged, sparsely-populated portions of the coast, as well as some of the most densely populated. Forest products, tourism, and second home development dominate the economy of Sonoma County; much of Marin County is in public ownership in Point Reyes National Seashore. San Francisco County is almost 100 percent urbanized.



NORTH CENTRAL COAST REGION

41. Russian River Estuary
42. Salmon Creek Lagoon
43. Bodega Harbor
44. Estero Americano
45. Estero de San Antonio
46. Tomales Bay
47. Point Reyes Ponds & Bays
48. Abbott's Lagoon
49. D Ranch Pond
50. Drake's/Limantour Estero
51. Wildcat Lake
52. Ocean Lake
53. Crystal Lake
54. Pelican Lake
55. Bass Lake
56. Bolinas Lagoon
57. Rodeo Lagoon

Figure 4. North Central Coast Region

Photo 9. Big River is typical of the moderate sized North Coast rivers-minimal waterfowl habitat.







Photo 10. Stone Lagoon provides freshwater habitat.

Photo 11. Klamath River Estuary





Photo 12. Gualala River Estuary

Wetland habitat is represented by large lagoons, salt and brackish tidal marsh and moderate-sized estuaries. The dominant wetlands include Bodega Bay and harbor, Tomales Bay, Estero Americano, Estero de San Antonio, Drake's and Limantour Esteros, and Bolinas Lagoon. These areas are the most important waterfowl areas in the North Central Region.

The climate of the North Central Coast is best described as Mediterranean; winters are cool and wet, while summers are warmer and dry. Fog is a predominant feature of the summer season. Rainfall ranges from 20 to 40 inches or more annually within the Region. Freezing temperatures are rarely recorded, and summers are rarely hot.

There are no NWRs or WMAs in the North Central Coast Region. The CDFG maintains an ER on Tomales Bay.

B. Habitat Acreage

The North Central Coast Region contains about 14,640 acres of wetlands, of which about 14,200 are important to waterfowl (Table 5). These totals represent about ten percent of all the wetlands existing along the coast. The size of individual wetland units ranges from nine to 9,000 acres in size. The Upper Tomales Bay ER is about 540 acres.

C. Waterfowl Use

The North Central Coast Region bays are censused during the mid-winter inventories (Table 1). An average of about 20,000 waterfowl, excluding coots, were recorded in 1976 and 1977. Sea ducks were most numerous with 9,000 birds, followed by diving ducks at 6,800 and dabblers at 5,500. Pacific brant use this region, but few are ever present in mid-winter.

Average annual waterfowl use-day figures for various North Central Coast wetlands are presented below:

Area	Average Annual Waterfowl Use-Days
Bolinas Lagoon	190,000
Tomales Bay	640,000 (November & December only)
Estero Americano	40,000
Estero de San Antonio	17,000
Bodega Harbor	113,000 (November & December only)
Limantour Estero	135,000 (Ducks); 85,000 (Brant)
Drake's Estero	272,000 (November & December only)
Abbott's Lagoon	113,000

Photo 13. Russian River Estuary





Photo 14. Bodega Harbor provides excellent waterfowl habitat.

Photo 15. Estero de San Antonio





Photo 16. Tomales Bay provides habitat important to brant.

3. San Francisco Bay Area (Figure 5)

A. Description

The San Francisco Bay area is one of the two most densely populated urban areas in California. It encompasses parts of nine counties. A population of 6.2 million is projected for 1980. San Francisco Bay is one of the largest natural harbors in the world and maritime commerce is vital to the economic base of the area. The Bay itself is about 400 square miles. About two-thirds of the Bay is less than 18 feet deep at low tide; in the South Bay and San Pablo Bay, the depth two to three miles offshore may be only five or six feet at low tide. Modern port facilities and deep water channels are located throughout the area. About 40 percent of the original water surface area and 75 percent of the Bay marshlands have been diked off or filled in since 1850. Urbanization lines the shoreline around the Bay.

In 1965, the San Francisco Bay Conservation and Development Commission (BCDC) was formed to regulate fill and other destructive activities in the Bay area. BCDC has jurisdiction in all tidelands and 100 feet above mean higher high water. This organization has been effective in controlling development and wetland losses in many cases.

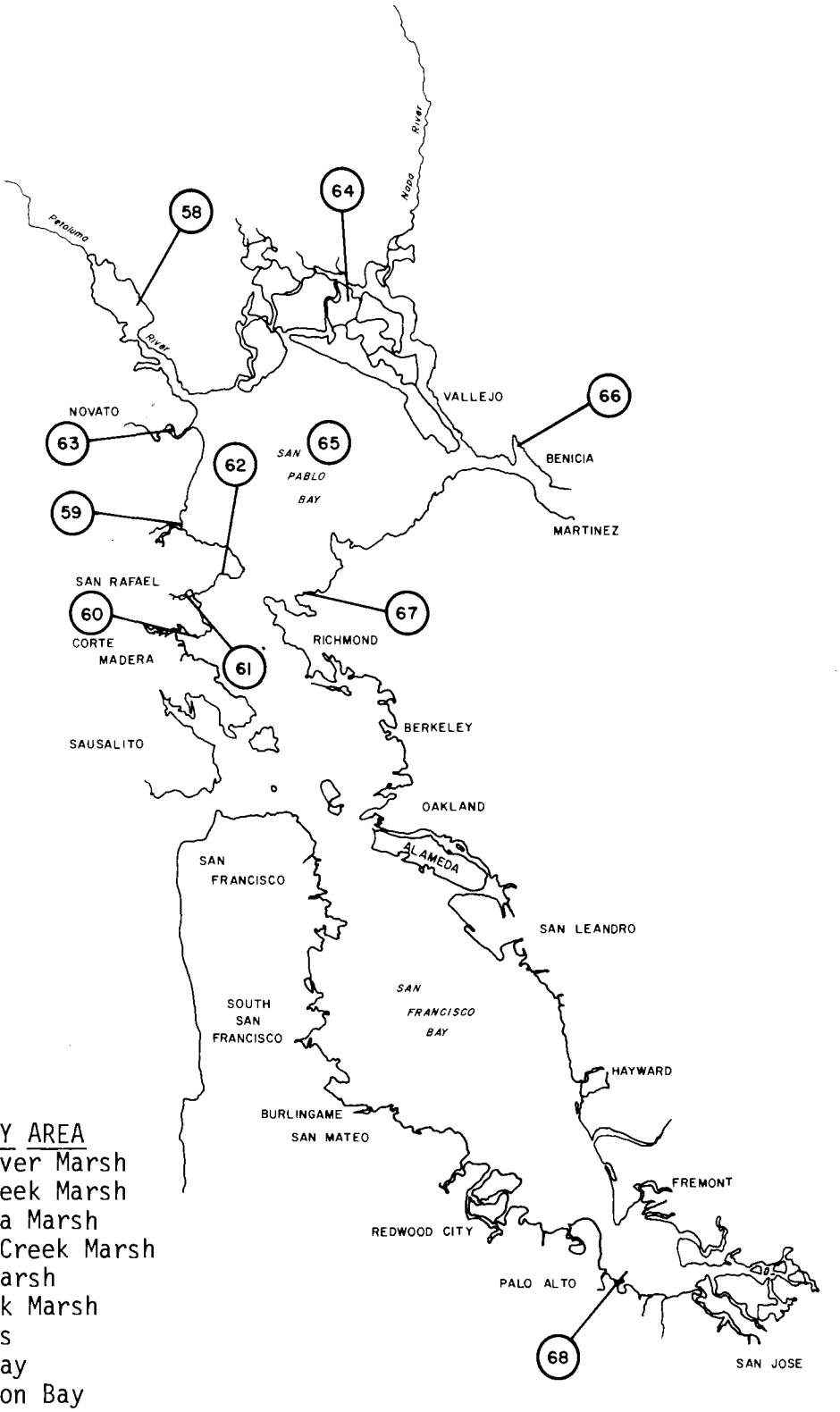
The major wetlands associated with San Francisco Bay include the tidal marshes and salt ponds of the South Bay, the Petaluma Marsh area, the Napa Marshes, and San Pablo Bay. Corte Madera Marsh, San Rafael Creek Marsh, Gallinas Creek Marsh, and North Richmond Marsh also provide habitat.

Suisun Marsh is often discussed as part of the San Francisco Bay and San Joaquin-Sacramento River Delta complex. However, it has been covered in the Central Valley Concept Plan and will not be repeated here. The State owns some WMAs and ERs in the Bay area, and San Pablo and San Francisco Bay NWRs are being acquired. There are many private duck clubs in the South Bay and Napa Marshes.

The climate of the Bay Area is Mediterranean, with cool summers and cold, wet winters. Coastal fog is common in summer and serves to moderate the otherwise high temperatures. Average rainfall ranges from 20 to 40 inches within the drainage basin of the Bay.

B. Habitat Acreage

The important wetland areas total over 93,000 acres. This figure includes tidal salt marsh; salt production ponds;



SAN FRANCISCO BAY AREA

58. Petaluma River Marsh
59. Gallinas Creek Marsh
60. Corte Madera Marsh
61. San Rafael Creek Marsh
62. San Pedro Marsh
63. Novato Creek Marsh
64. Napa Marshes
65. San Pablo Bay
66. South Hampton Bay
67. North Richmond Marsh
68. South San Francisco Bay

Figure 5. San Francisco Bay Area



Photo 17. Petaluma Marsh is one of the most significant wetlands for waterfowl in the San Francisco Bay area.

Photo 18. South San Francisco Bay tidal salt marsh habitat.





Photo 19. Commercial salt production ponds provide waterfowl habitat-Napa Marshes.

some freshwater areas; nontidal wetlands behind dikes which are maintained by rain, freshwater inflow, or seepage; and open bay water (Table 5). This does not include diked agricultural lands. The most critical wetlands of importance to waterfowl include the Napa Marsh-San Pablo Bay complex at 45,000 acres, the Petaluma Creek Marshes at 3,800 acres, and South San Francisco Bay at 43,000 acres.

About 22 percent of the Bay is under private ownership, 23 percent is owned by cities, the State owns 50 percent, and the federal government presently holds title to 5 percent. San Pablo NWR presently encompasses 11,711 acres, and an additional 4450 acres are being proposed for acquisition. San Francisco Bay NWR will ultimately total 23,000 acres. The Petaluma Marshes are being acquired by the state, and the WMA will ultimately total about 2,400 acres or more. The Coon Island state-owned ER in the Napa Marshes totals 250 acres.

About 3,000 acres of Leslie salt ponds in Napa Marsh are leased by the CDFG to provide public hunting opportunities. The Navy owns 3,600 acres in Napa Marsh.

About 3,000 acres of private duck clubs are present in the Napa Marshes, some of which are lease agreements with Leslie Salt. Presently, 1,000 acres of duck club are maintained in south San Francisco Bay. Prior to acquisition of SF Bay NWR, a larger number of club acreage was leased from Leslie Salt. Acreages of the various ERs and WMAs are listed in Table 4.

C. Waterfowl Use

Waterfowl make extensive use of the tidal marshes, salt ponds, and open water of all parts of San Francisco Bay. Over 16.5 million average annual waterfowl use-days were calculated for the Bay marshes and near-shore open waters in 1964-65. If the open water areas had been inventoried, total use recorded would have been much greater. Over 500,000 waterfowl were counted on the Bay in December, 1964.

Average annual waterfowl use-day figures are presented below for various San Francisco Bay wetland units:

South SF Bay*	8.4 million
Corte Madera Marsh*	1.6 million
Napa Marshes	1.4 million
San Rafael Marsh*	1.3 million
North Richmond Marsh*	300,000
Petaluma Marsh	65,000 (November & December only)

*Includes adjacent open bay water.

Photo 20. San Francisco Bay--Gallinas Creek tidal salt marsh.





Photo 21. San Francisco Bay--North Richmond tidal and diked salt marsh.

Photo 22. Napa Marshes--Tidal and diked salt marsh.





Photo 23. San Pablo Bay--Open water habitat, and diked and tidal salt marsh.

Mid-winter populations have averaged 150,000 in recent years (Table 1). Two-thirds of all the waterfowl recorded along the coast during the mid-winter inventories are found in San Francisco Bay. Sixty percent of the dabblers, 80 percent of the divers, and 45 percent of the sea ducks recorded during these surveys are found in the Bay. The Bay is particularly important to the Pacific Flyway canvasback, and greater and lesser scaup populations. Surf scoters also depend heavily upon Bay habitat. Pintails, shovelers, and wigeon are the most abundant dabblers represented in winter counts. Brant and other geese and swans are seen only rarely in the Bay.

Earlier in the season, the Bay is more important to pintails; up to 30,000 have been counted in the Napa Marshes alone in September and October. Many more are present in the South Bay at this time. Likewise, canvasback use of the Bay is significantly greater prior to the onset of heavy winter rains. Virtually all of the canvasbacks present in California, two-thirds of the Pacific Flyway total, may be found on the Bay, especially in the Napa Marsh-San Pablo Bay area, before winter rains provide extensive inland habitat. Over 40,000 canvasbacks have been counted on San Pablo Bay at one time and 12,500 in the Napa Marshes. The California coast winters 65% of the Flyway's greater scaup, most of which are found in San Francisco Bay.

4. Central Coast Region (Figure 6)

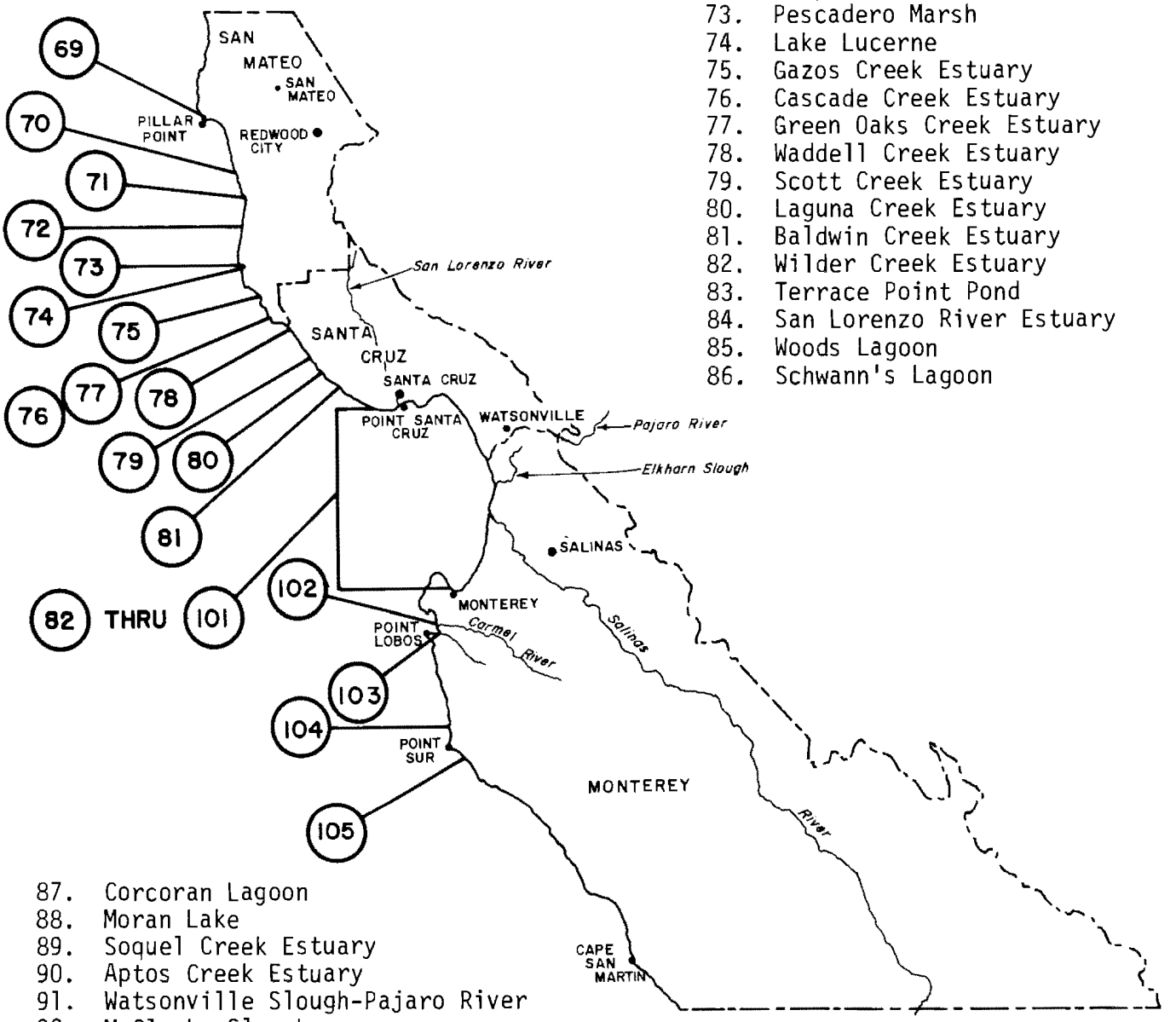
A. Description

The Central Coast Region encompasses San Mateo, Santa Cruz, and Monterey Counties. It extends 209 miles south of the densely populated County of San Francisco, through scenic Half Moon and Monterey Bays, Big Sur, and south along the rugged coastal mountains. The regional economy is based upon agriculture in the Salinas and Pajaro River Valleys; and tourism, centering around the City of Santa Cruz, the Monterey Peninsula, and the rugged mountains and wide beaches and coves of the coast. Coastal agriculture is dominated by the artichoke industry. The upper drainages of the coast range are dominated by redwood, fir and pine forests in the north and brush communities in the south.

The most important waterfowl habitat on the Central Coast Region is included in the Elkhorn Slough and Pescadero Marsh areas. The latter is primarily a freshwater marsh, while Elkhorn is an estuary. Most of the many wetland areas are small, urbanized, and/or support little waterfowl use. Habitat consists of salt marsh, freshwater ponds and lagoons, and estuarine environments.

CENTRAL COAST REGION

69. Princeton Marsh
70. Tunitas Creek Estuary
71. San Gregorio Creek Estuary
72. Pompanio Creek Estuary
73. Pescadero Marsh
74. Lake Lucerne
75. Gazos Creek Estuary
76. Cascade Creek Estuary
77. Green Oaks Creek Estuary
78. Waddell Creek Estuary
79. Scott Creek Estuary
80. Laguna Creek Estuary
81. Baldwin Creek Estuary
82. Wilder Creek Estuary
83. Terrace Point Pond
84. San Lorenzo River Estuary
85. Woods Lagoon
86. Schwann's Lagoon



87. Corcoran Lagoon
88. Moran Lake
89. Soquel Creek Estuary
90. Aptos Creek Estuary
91. Watsonville Slough-Pajaro River
92. McClusky Slough
93. Bennett-Elkhorn Slough
94. Moro Cojo Slough
95. Old Salinas River
96. Salinas River Estuary
97. Trembladero Slough
98. Marina Ponds
99. Laguna Del Rey
100. Del Monte Lake
101. El Estero Lake
102. Carmel River Estuary
103. San Jose Creek Estuary
104. Little Sur River Estuary
105. Big Sur River Estuary

Figure 6. Central Coast Region

Photo 24. Elkhorn Slough, because of its endangered species values, is being acquired with LWCF funds.





Photo 25. The Pajaro River Estuary provides only marginal waterfowl habitat.

Photo 26. Pescardero Marsh is an excellent freshwater wetland in the Central Coast Region.





Photo 27. McClusky Slough provides freshwater habitat for waterfowl.

The marine climate of the Central Coast Region is one of the most moderate in Califonria. The ocean-moderated summer temperatures rarely exceed 70°F, and the mean winter temperatures don't get below 37°F. Average precipitation ranges between 18 and 21 inches per year. The rainy season is November through March, and the summers are dominated by fog and onshore flow of marine air.

B. Habitat Acreage

Central Coast wetland habitat makes up about three percent of that present along the coast (Table 3). Most of the wetland units are small. Of a total of 4,350 acres of wetlands, about 3,700 have significant value to waterfowl (Table 5). The most important areas are the 520-acre Pescadero Marsh and 2,500-acre Elkhorn Slough area (Watsonville Slough, Pajaro River estuary, McClusky Slough, Old Salinas River and Salinas River) (Table 6).

C. Waterfowl Use

The largest waterfowl use in the Central Coast Region occurs in the Pajaro River-Elkhorn Slough-Salinas River area of Monterey Bay. Mid-winter surveys do not include Elkhorn Slough or any of the Central Coast wetlands, but sporadic surveys provide some data.

A peak waterfowl population of 2,400 was recorded in the Slough in 1968. This translates to about 375,000 waterfowl use-days over the October-to-March period. This is comparatively light use relative to the size of the estuary. Shorebird use, conversely, is quite high, with 1968 use-days calculated at 2.9 million, with a peak of 17,500 birds.

The most important species represented and peak numbers recorded in 1968 are presented below:

Pintail	147	Dec	Scaup Sp.	395	Dec
Mallard	50	Aug	Ruddy Duck	932	Jan
Shoveler	248	Feb	Common Goldeneye	27	Jan
Cinnamon teal	300	Aug	Surf Scoter	397	Feb
Green-winged teal	119	Mar	White-winged scoter	187	Dec., Mar.
Wigeon	25	Apr			

A March, 1978 survey recorded about 100 ducks using the Pajaro River-Watsonville Slough area. Surf scoters (30) and cinnamon teal (55) made up the bulk of birds seen. Scaups, buffleheads, white-winged scoters, ruddy ducks and common mergansers were seen.

Photo 28. Corcoran Lagoon is typical of the Santa Cruz area lagoons- heavily urbanized.





Photo 29. Scott Creek is typical of the smaller Central Coast wetlands.

No specific data are available for the Salinas River estuary. It is the third largest wetland in the Central Coast Region, and use could be significant at times. Little marsh is present.

The numerous small estuaries, freshwater ponds, and lagoons present in the Central Coast region apparently do not contribute to the support of large waterfowl populations at any given time; only small numbers of a limited number of species have been recorded in late winter and spring for a small number of these areas. Of course, the total use of a wetland is a function of turnover rate, as well as total numbers present at any given time. The data below for ten areas censused during February and March 1978 is probably representative of the small Central Coast wetlands.

Area	Acres	Sea ducks*	Divers	Dabblers*
Tunitas	11	50	0	0
San Gregorio Cr.	6	9	0	2
Pompanio Cr.	1	2	0	0
Waddell Cr.	50	26	0	0
Scott Cr.	100	3	0	12
Wilder Cr.	8	2	0	8
San Lorenzo R.	37	2	5	8
Woods Lagoon	50	20	20	16
Corcoran Lagoon	26	54	17	13
Aptos Cr.	4	6	0	0

*Sea Ducks - Scoters, mergansers, bufflehead, goldeneyes
Divers - Canvasback, scaup, ruddy
Dabbler - Mallard, pintail, gadwall, teal

Pescadero Marsh supports significant waterfowl use. A 1971-72 bimonthly census recorded a total of 70,000 use-days.

5. South Central Coast Region (Figure 7)

A. Description

The South Central Coast Region includes 250 miles of coastline, and encompasses San Luis Obispo, Santa Barbara and Ventura Counties. The South Central Coast landscape includes steeply sloping mountain ranges, broad alluvial plains, and rolling foothills. Much of the Region is unspoiled, but development pressures are intense for housing, industry, and energy.

The most important wetland areas in the South Central Coast Region are Morro Bay, Dune and Oso Flaco Lakes, and Mugu Lagoon. Other important areas include the Santa Maria River,

SOUTH CENTRAL COAST REGION

106. Arroyo de la Cruz
107. Arroyo del Corral
108. Arroyo Laguna
109. Little Pico Creek Estuary
110. Pico Creek Estuary
111. San Simeon Creek Estuary
112. Santa Rosa Creek Estuary
113. Morro Bay
114. San Luis Obispo Creek Estuary
115. Pismo Marsh
116. Oceano Lagoon
117. Dune Lakes
118. Oso Flaco Lake
119. Santa Maria River Estuary
120. Shuman Creek Estuary
121. San Antonio Creek Estuary
122. Santa Ynez River Estuary
123. Canada Honda Creek Estuary
124. Jalama Creek Estuary
125. Deveraux Lagoon
126. Goleta Slough
127. Carpenteria Marsh
128. Ventura River Estuary
129. Santa Clara River Estuary
130. McGrath Lake
131. Mugu Lagoon-Calleguas

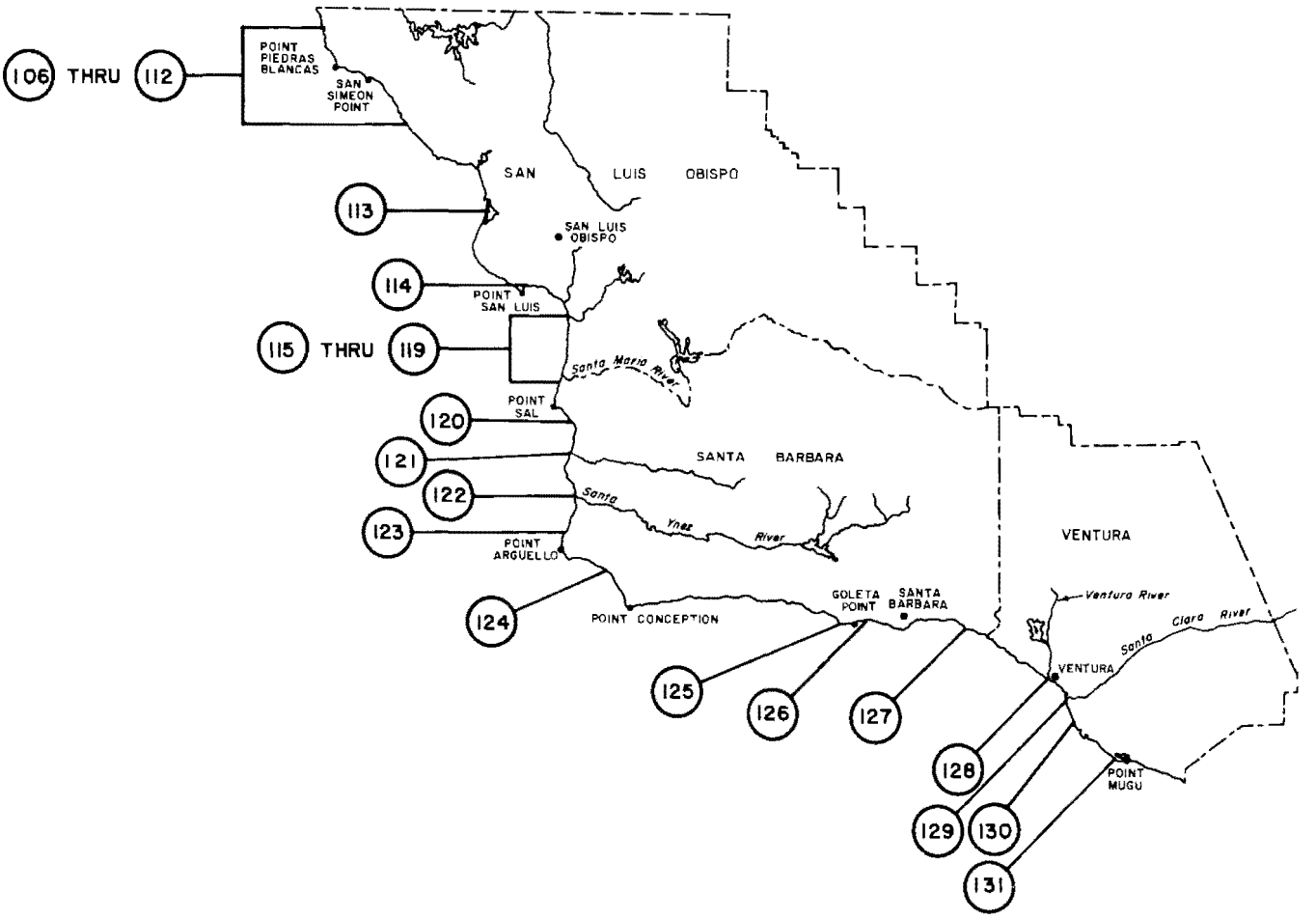


Figure 7. South Central Coast Region

Santa Ynez River, Goleta Slough, and Carpenteria Marsh. Habitat types include estuarine, salt marsh, freshwater ponds, dune lakes, and mud flats.

The climate is generally mild, with cool summers and colder, wet winters. Average high temperatures are moderate. Average rainfall ranges from 10 to 24 inches. Freezing temperatures are rare. Coastal fog is a common summer occurrence.

B. Habitat Acreage

Wetland areas in the South Central Coast Region total about 7,900 acres, or five percent of the acreage along the entire coast (Table 3). Over 6,900 acres of this total have some value for waterfowl (Table 5). The most important waterfowl areas include Morro Bay at 2,600 acres; Dune and Oso Flaco Lakes at 1,090 acres; Santa Maria River estuary at 315 acres; Goleta Slough and Carpenteria Marsh at 590 acres, and Mugu Lagoon at 2,355 acres (includes 620 acres private duck clubs adjacent to Lagoon) (Table 5).

C. Waterfowl Use

None of the South Central Coast Region wetlands are inventoried during the mid-winter surveys, except Morro Bay which is surveyed for pacific brant (Table 2). The number of brant spending the winter in Morro Bay and other Southern California areas has declined drastically (Table 2). The potential exists to retain 5,000 or more brant during the winter, and steps are being taken to achieve this goal. Over 25,000 waterfowl, shorebirds, and waders have been counted on Morro Bay at one time. As many as 11,800 brant were seen on the Bay in 1955. More recent brant numbers include 8,000 seen during a census conducted 1966-1967. Over 2,400 ducks were counted during the 1966-1967 survey. This compares with 15,600 shorebirds, waders, grebes and other water birds. Pintails, green-winged teals, lesser scaups, wigeons, ruddy ducks and buffleheads are the most common ducks using Morro Bay. Average annual use figures for the various water bird species using Morro Bay were calculated from the 1966-1967 census data and are presented below:

Brant	872,000 use-days
Ducks	294,000 use-days
Shorebirds	1.55 million use-days
Other	657,000 use-days

The freshwater Dune Lakes and Oso Flaco Lake support substantial waterfowl populations, although shorebirds comprise the

Photo 30. Morro Bay is the largest and most important wetland on the South Central Coast.





Photo 31. Pismo Marsh is an Ecological Reserve.

Photo 32. Oso Flaco Lake is part of the Dune Lakes area. This is important freshwater habitat.





Photo 33. The Santa Ynez River Estuary provides good waterfowl habitat-Vandenberg AFB.

majority of water birds in the dune region. A CDFG survey at the mouth of the Santa Maria River between 1970 and 1972 recorded 250,000 average annual shorebird use-days.

An annual average of about 21,000 waterfowl use-days were recorded at the mouth of the Santa Maria River in the 1970-1972 period. No use data are available for the dune lakes, but over 15,000 ducks have been recorded at one time, usually prior to the hunting season. If this population level were maintained for one month, 450,000 use-days would result. Pacific brant are occasionally seen at the mouth of the Santa Maria River. Ruddy ducks, mallards, cinnamon teals, lesser scaups, wigeons, and pintails are relatively common ducks in the South Central Coast wetlands.

Goleta Slough is heavily used by waterfowl, considering its size. Over 150,000 average annual use-days have been recorded. Most use is by pintails, wigeons, and shovelers. Lesser scaups are the most common diving ducks. Brant are occasionally seen. Waterfowl use accounted for 40 percent of all bird use as shown below:

Species	Average Annual Use-Days (1966-1967)
Brant	30
Dabblers	104,445
Divers	2,443
Shorebirds	40,000
Waders	6,500
Coots	98,800

Carpenteria Marsh supports significant waterfowl populations. Over 61,000 duck use-days were recorded in 1967. A peak of 750 ducks was present in February. Shorebirds are far more abundant, with peaks over 1,000 recorded. About 194,000 average annual shorebird use-days were calculated for this area.

Mugu Lagoon is the second largest marsh on the South Central Coast and receives considerable waterfowl use, both on the salt marsh areas of the Lagoon proper and the adjacent freshwater marshes of the duck clubs. About 314,000 annual waterfowl use-days were recorded in the Lagoon during a 1976-1977 census. Other observations of "several thousand" waterfowl on each arm of Mugu Lagoon, and reports of 10,000 "birds" and 40 brant overwintering on the Lagoon give some idea of the magnitude of use. Pintails, shovelers, green-winged and cinnamon teals, and wigeons are common, but ruddy ducks are the most numerous accounting for three quarters of the use-days. Over 10,000 coots have been observed at one time. The duck clubs adjacent to Mugu Lagoon support up to 30,000 ducks at times.

Photo 34. Carpenteria Marsh has been preserved by local and University of California efforts.





Photo 35. Mugu Lagoon tidal salt marsh provides excellent waterfowl habitat.

6. South Coast Region (Figure 8)

A. Description

The South Coast Region includes about 100 miles of coastline and encompasses Los Angeles and Orange Counties. The upper drainages consists of chaparral-covered mountains. This is the most heavily urbanized and populated section of the coastal zone. The few remaining natural areas, such as cliffs, mountains, estuaries, and other wetlands, contrast dramatically with the region's urban character. The South Coast will bear the brunt of energy production and distribution demand in the future. South Coast wetlands and the marine environment have been significantly degraded by the tremendous crush of humanity. Recreational demand for natural resources is outstripping supply. The South Coast region contains fewer wetlands than any other stretch of the coast.

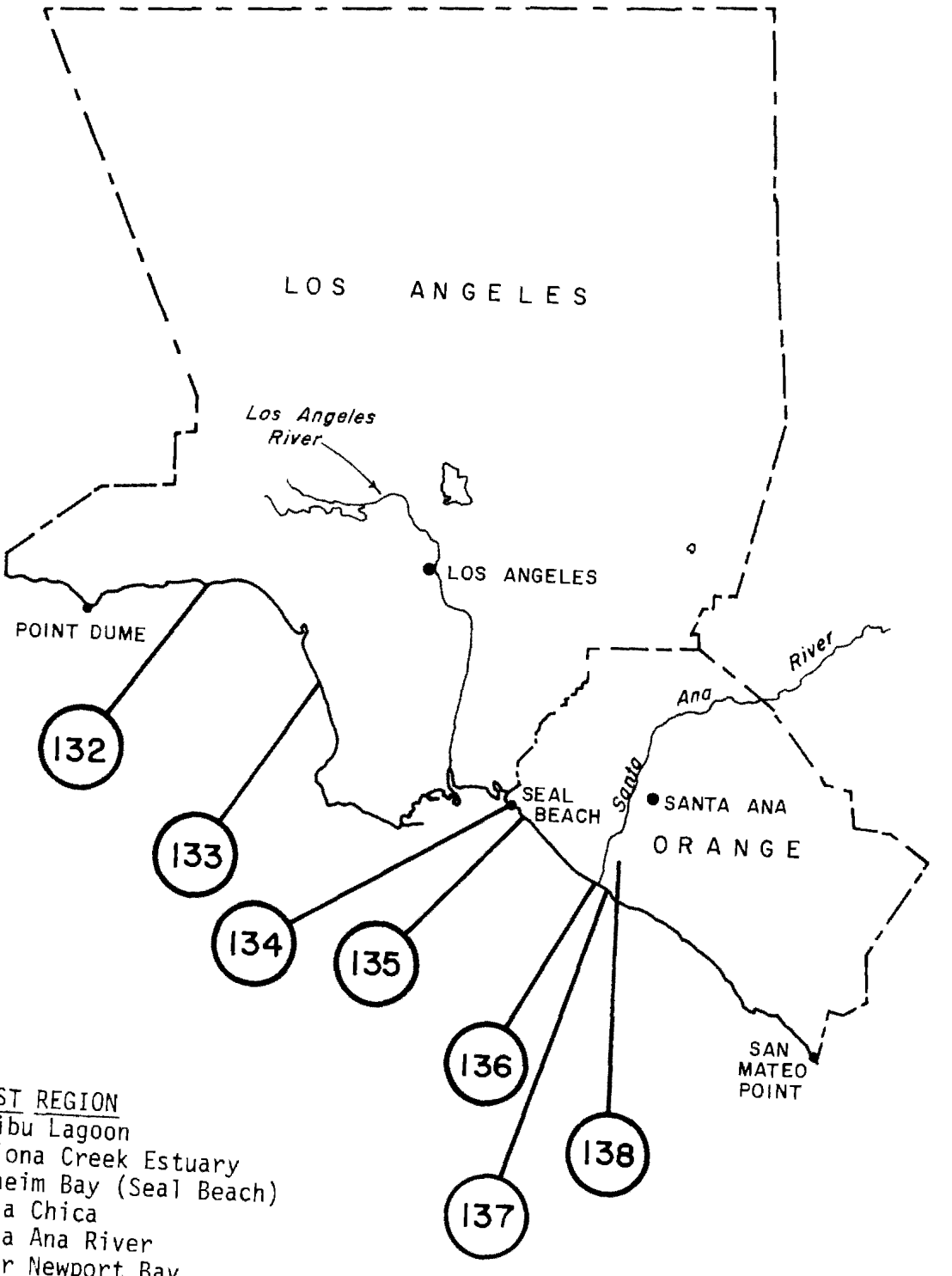
The climate is characterized as dry-summer, subtropical, with warm summers tempered by ocean breezes and mild winters. Average annual rainfall is 12 inches. Freezing temperatures are rare. Fog is both a summer and winter phenomenon. Hot, dry Santa Ana winds blow from the inland deserts during the fall season.

B. Habitat Acreage

The South Coast Region's 3,300 acres of wetlands account for only about two percent of the total acreage on the coast (Table 3). Of this total, about 3,100 acres in three wetland areas have waterfowl value (Table 5). Seal Beach NWR accounts for 977 acres in Anaheim Bay. The upper Newport Bay ER and Bolsa Chica ER total about 1,300 acres.

C. Waterfowl Use

Waterfowl use of the South Coast marshes is substantial. An annual average of over one million use-days has been calculated for Upper Newport Bay and 784,000 for Anaheim Bay. Bolsa Chica quantitative data are limited. Nearly 200,000 waterfowl use-days (mostly pintail and wigeon) were calculated from mid-December 1977 through January 1978. Peaks of 3,000 ducks and shorebirds are common during the winter. Red-breasted mergansers, lesser scaups, wigeons, shovelers and green-winged teals are also well represented. Pintails and wigeons are the most common ducks on Newport Bay. Quantitative data for the smaller south coast wetlands are not available, but waterfowl use of areas, such as the Santa Ana River mouth, is very limited.



SOUTH COAST REGION
132. Malibu Lagoon
133. Ballona Creek Estuary
134. Anaheim Bay (Seal Beach)
135. Bolsa Chica
136. Santa Ana River
137. Upper Newport Bay
138. San Joaquin Marsh

Figure 8. South Coast Region

Photo 36. Anaheim Bay--Seal Beach NWR protects these important wetlands.





Photo 37. Bolsa Chica provides important South Coast habitat. A major restoration project is underway.

Photo 38. Upper Newport Bay is protected as an Ecological Reserve.





Photo 39. Southern California coastal wetlands are critical to shorebirds and other water related wildlife.

7. San Diego Coast Region (Figure 9)

A. Description

The San Diego Coast Region encompasses only San Diego County and 76 miles of coastline. It is densely populated in the San Diego Bay area and includes eight cities and substantial federal land--mostly military holdings. The coastline is characterized by scenic bluffs, long beaches, open space, and urban-industrial skylines.

The several lagoons, estuaries, marshes and mud flats contrast dramatically with other coastal features. The habitat is valuable to a host of water birds and endangered species. Exceptional recreational opportunities are present, associated with the wetlands. There are no NWRs, or WMAs, but the state administers several ERs. The most important wetlands include Whelan and Windmill Lakes; Buena Vista, Agua Hedionda, Batiquitos, San Elijo, San Diequito and Los Penasquitos Lagoons; South San Diego Bay; and Tijuana Slough. Some of the best habitat lies within the borders of Camp Pendleton, a marine corps base.

The climate of the San Diego Coast is very mild year-round and is characterized as subtropical Mediterranean. Summers are dry and warm, and winters are wetter and cool. Seasonal rainfall averages ten inches between November and April. Fog is common in summer, and Santa Ana winds are common in the fall season.

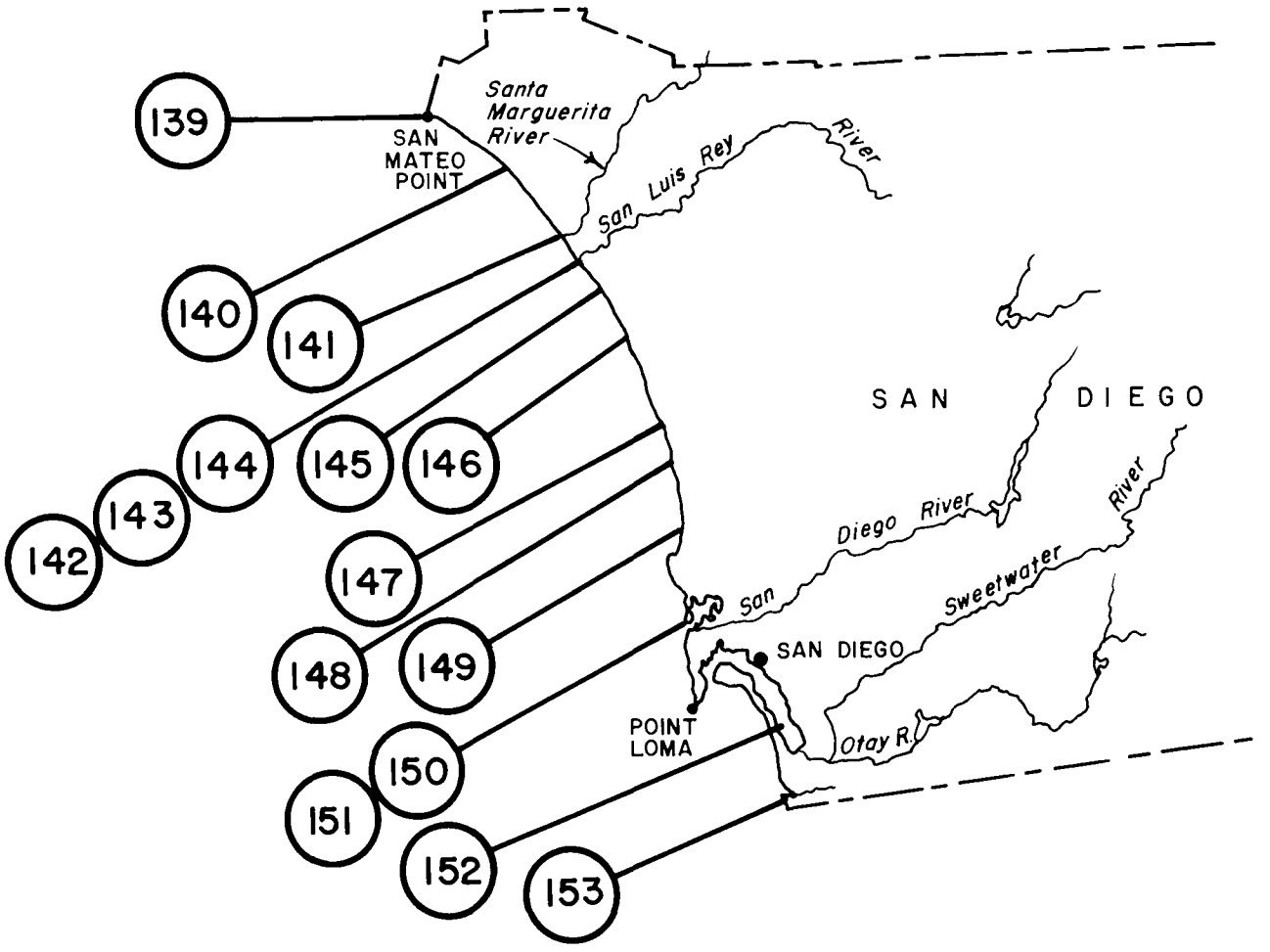
B. Habitat Acreage

The 7,720 acres of San Diego Coast wetland habitat represent five percent of the entire coast acreage (Table 3). Of this total, about 5,700 acres are considered to have at least some value to waterfowl (Table 5). The 200 acres of Buena Vista Lagoon, 268 acres of San Elijo Lagoon, and 135 acres in Batiquitos Lagoon are ERs administered by the CDFG.

C. Waterfowl Use

Regular waterfowl inventories are not conducted in the San Diego Coast Region except for brant (Table 2). Since 1968, when 480 were censused, no brant have been counted in San Diego Bay. In the past (1958) up to 1,800 brant had been counted in the Bay during the mid-winter inventory.

Waterfowl use of the Camp Pendleton wetlands (includes Santa Marguerita River mouth and other lakes & ponds) was about



SAN DIEGO REGION

139. San Mateo Creek Estuary
140. Los Flores Creek
141. Santa Marguerita River Estuary
142. San Luis Rey River-Whelan Lake
143. Loma Alta Creek Estuary
144. Buena Vista Lagoon
145. Agua Hedionda Lagoon
146. Batiquitos Lagoon
147. San Elijo Lagoon
148. San Diequito Lagoon
149. Los Penasquitos Lagoon
150. Mission Bay
151. San Diego Flood Channel & River
152. South San Diego Bay
153. Tijuana Slough

Figure 9. San Diego Region

527,000 use-days in 1972. Quantitative data for San Diego coast lagoons are presented below:

Area	Average Annual Waterfowl Use-Days
Santa Marguerita River Mouth	500,000
Batiquitos Lagoon	550,000
San Diequito Lagoon	120,000
Los Penasquitos Lagoon	215,000
Agua Hedionda Lagoon	100,000
San Elijo Lagoon	400,000
South San Diego Bay	2.7 million

Quantitative data are skimpy for Buena Vista Lagoon, but overall water bird use and probably waterfowl use, is equivalent to the other lagoons listed above. It has been reported that 70,000 waterfowl use Buena Vista at a time. Up to 5,300 pintails have been recorded on San Elijo and 3,700 pintails on Batiquitos Lagoon in December. Waterfowl use of the Tijuana Slough area is light relative to the other areas. Mission Bay receives some use but is largely devoted to housing and marinas. Waterfowl use the San Diego River Floodway, but no quantitative data are available. Over 30,000 surf scoters have been seen on San Diego Bay at one time, along with thousands of scaups and buffleheads.

The San Luis Rey River area is most important for Whelan and Windmill Lakes about four miles from the River mouth. Whelan Lake supports 5,000 Canada geese and up to 9,000 ducks. This population of geese has been building for a number of years because of artificial feeding and protection from hunting and disturbance.

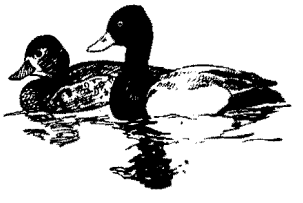


Photo 40. The Santa Margarita River Estuary is protected on the Camp Pendleton Marine Corps Base.

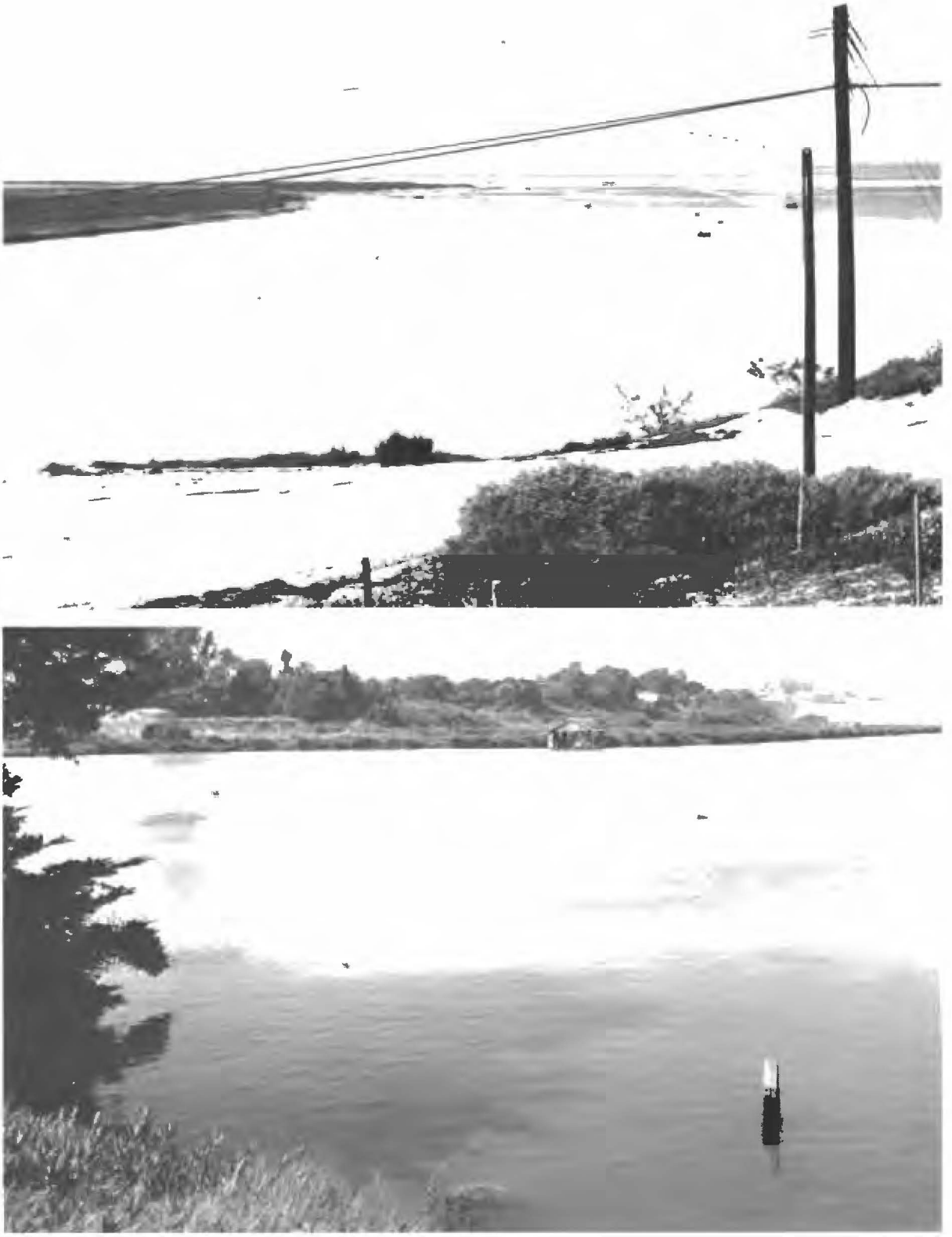


Photo 41. Buena Vista Lagoon is protected as an Ecological Reserve.

Photo 42. Part of Batiquitos Lagoon is an Ecological Reserve--the remainder is unprotected.





Photo 43. San Elijo Lagoon provides important San Diego County waterfowl habitat. It is an Ecological Reserve.

Photo 44. San Diego Bay wetlands--Sweetwater marsh.





Photo 45. Tijuana Slough has been proposed for acquisition with LWCF funds to protect endangered species.

Former Tidal Wetlands--North Richmond Marsh



V. Habitat Threats

V. HABITAT THREATS AND ASSOCIATED PROBLEMS

A. Historical Wetland Loss

Prior to settlement by pioneers, California had an estimated five million acres of permanent, seasonal, and tidal wetlands. The rate of wetland loss in the State is depicted in Figure 10.

Although most of this loss has occurred on inland wetlands, coastal tidal marsh has also been lost at a high rate. At the turn of the century, coastal tidal marsh and mud flats (excluding Suisun Marsh) covered approximately 381,000 acres. Present acreage approximates 105,000 acres, representing a 70 percent loss. In Southern California, only 8,500 acres of marsh and mud flats (does not include open bays and salt ponds) remain from the original 85,000 acres once present--a loss of 90 percent.

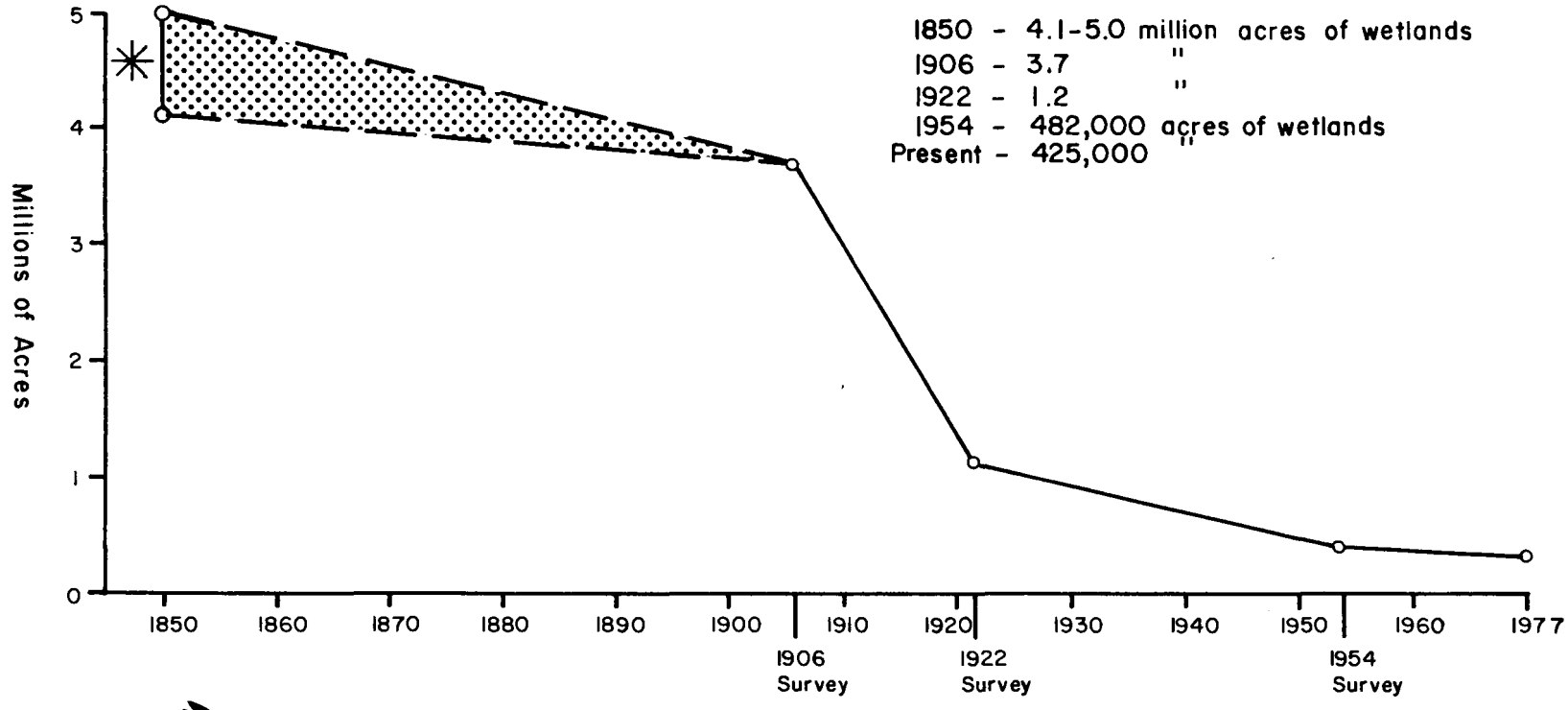
Most coastal wetlands have been lost to dredging, dike-and-fill operations for industry and housing, and marina development. Pollution and human disturbance have degraded and destroyed the value of many remaining wetlands. Conversion of tidal marsh to salt evaporation ponds and nontidal wetlands by diking has occurred over large acreages in several areas.

B. Recent Waterfowl Habitat Losses/Gains and Continuing Threats

Documentation of recent wetland losses within the last 15 years is not available for all coastal areas. However, consideration of several representative examples gives a good idea of the general magnitude of change. Recent losses primarily consist of small projects which continue to chip away at remaining habitat. Many thousands of acres of tidal salt marsh have been diked in the past in preparation for development, but have not yet been filled. These marsh areas behind dikes are more vulnerable to loss than existing tidal marshes which are protected by legislation, permit requirements, the Coastal Commission, and an aggressive posture by the FWS and CDFG.

1. North Coast Region

Humboldt Bay has been reduced in size substantially during the past 120 years. The Bay, including its adjacent salt and brackish water marshes, was originally 27,000 acres in size before development began. Reclamation projects beginning in the late 1800s, and still continuing, have reduced the Bay to about 17,000 acres--a 37 percent reduction. Most importantly, the Bay retains only 600 of the original 7,000 acres of salt marsh.



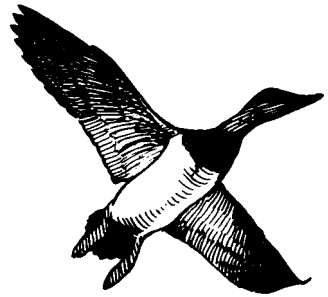


Figure 10. Graphic display of wetland losses in California.

✳ Estimates prior to 1900 range from 4.1 to 5 million acres.

Examples of continuing losses include a 45-acre fill in Arcata Bay (North Humboldt Bay) as a refuse dump; another refuse dump fill located adjacent to Highway 101; a salt marsh fill of several acres to create space for decking logs; the Humboldt Bay bridge involved filling of salt marsh and mud flats; and Woodley Island Marina, which will remove about ten acres of marsh, has been approved. Mitigation will reduce some of the impacts of these losses, but several acres of eelgrass beds may be lost without compensation.

Dredge and fill projects for small boat harbor proposals may continue to eliminate habitat in the future. However, mitigation requirements in the form of restoration of diked former tidal marsh should compensate for most projects. A significant opportunity exists to restore diked former tidal marsh.

The Smith and Eel River Deltas have not changed significantly in the last 50 years. Major reclamation projects for agriculture and cattle grazing took place in the late 1800s and early 1900s and remain in place. Of the 33,000 acres of the Eel River Delta, 2,600 have been converted to residential and commercial uses, and 21,700 acres have been diked to create pasture for cattle. The remaining 8,700 acres include the best waterfowl habitat. However, even the 10,000 acres of poorly-drained pasture is good waterfowl habitat in winter. About 75 percent of the 8,300 acre Smith River Delta has been converted to agriculture and residential-industrial development. The remaining wild lands were important habitat. A 1,500 acre subdivision has been initiated on the northwest side of Lake Earl. Another 8,000-acre subdivision has been proposed between Crescent City and the Smith River.

Sedimentation, resulting from logging, agriculture, salt marsh reclamation, and dredging, has been a problem in the past and will continue--albeit at a slower pace. Water pollution of various kinds continues to degrade wetland habitat in Humboldt Bay, but is not a problem in the Eel or Smith River Deltas.

Urban-industrial expansion is the greatest future threat to the Lake Earl-Smith River Delta area and most of Humboldt Bay. Several large subdivision proposals have been received and/or approved which would, if constructed, eliminate a great deal of habitat. It is not anticipated that the Eel River Delta will suffer habitat loss from urbanization unless flood control projects proposed for the Eel River are constructed.

The Humboldt Bay Harbor and Conservation District was formed to control development and help preserve Humboldt Bay's

Photo 46. Marsh fill for industry--Humboldt Bay.





Photo 47. Diking of tidal marsh allows agricultural development--Eel River Delta.

Photo 48. Parts of Tomales Bay have been diked to create pasture for grazing.





Photo 49. Marsh development has eliminated large acreages of San Francisco Bay wetlands.

unique agricultural, scenic and biological values. Since the destruction of tidelands has been reduced, it has been successful, along with FWS and CDFG, in preventing large losses of wetlands. Ongoing and proposed dredging projects and sedimentation will always pose a threat to the Bay's eelgrass beds; but the importance of such beds to brant is well-known, and a great deal of effort goes into protecting them.

The FWS has been authorized to establish a NWR of about 8,700 acres for Humboldt Bay. Acquisition has been initiated and when completed, will insure perpetual protection of a large percentage of the eelgrass and tidal marsh.

2. North Central Coast Region

Wetland losses along the North Central Coast have not been as severe as other Regions of the California coast. About 2,300 acres of wetlands have been permanently protected in Point Reyes National Seashore, and other wetlands appear secure via local coastal program zoning.

No other development has occurred in these wetlands. The surface area of Bodega Harbor has been reduced 20 percent from dredge and fill operations during the last century. The harbor has decreased from 1064 acres to 842 acres. More than twice as much area was lost in the last 36 years than the previous 69 years. Tidelands have been filled to accommodate industrial development, restaurants, parking areas, golf courses, marina development, and airports.

Tomales Bay has lost habitat to diking for pasture development. At Bolinas Lagoon, a residential subdivision was developed in 1960 on the sandy peninsula which lies across the south end of the Lagoon. Dredge and fill associated with this subdivision was used to create an island and small lagoon.

Threats to North Central Coast wetlands include residential development on upland areas, as well as tidelands, water pollution, sedimentation, human disturbance of waterfowl and other wildlife, maintenance dredging of existing channels, and harbor development.

Development of uplands in the drainage basins of coastal wetlands poses serious problems for the estuary and lagoons. Upslope development increases sedimentation, lowers water quality, increases human populations and recreational use of the tidelands, and places increased demand for boat berthing and, hence, harbor development. This is a real problem at Bodega Harbor, Tomales Bay, and Bolinas Lagoon. It may



Photo 50. Tidal marsh has been eliminated for grain farming thoughout the north San Francisco Bay area--Gallinas Creek and Petaluma Marsh.

Photo 51. Airport development has eliminated large acreages of tidal marsh and mud flats in the San Francisco Bay area - Hamilton AFB, Gallinas Creek.





Photo 52. Tidal marsh has been eliminated by diking for commercial salt production--Napa Marshes.

soon be a threat to the Esteros Americano and de San Antonio. For the most part, the tidelands, mud flats and salt marshes themselves are protected in county and state coastal plans or as state tidelands, but adjacent uplands remain unprotected. Preservation of the wetlands may depend upon acquisition of these adjacent uplands.

3. San Francisco Bay Area

Past dike and fill developments on San Francisco Bay since 1850 have reduced the size of the Bay from 435,000 acres to little more than 256,000--a reduction of 40 percent. Although some of this diked land remains as salt ponds, with value to wildlife, tidal action has been eliminated. The tidal salt marsh bordering the Bay now totals about 75 square miles. Before diking and filling began, marshlands covered 300 square miles. This represents a loss of 75 percent of valuable waterfowl habitat. Diking for agriculture and salt production caused Napa Marsh losses, while diking-primarily for salt production and residential-commercial development--lead to South Bay marsh losses. The smaller Gallinas Creek, San Rafael, Corte Madera, and North Richmond Marshes have been almost completely filled, diked and/or developed.

The San Francisco Bay Conservation and Development Commission (BCDC) was created in 1965 to control filling and development activities in the Bay Area. Together with an aggressive FWS and CDFG posture in the Bay, wetland losses have been minimized in recent years. Mitigation is required for most fill operations that are permitted. However, the potential still exists for major wetland losses because of the tremendous economic pressures in the Bay Area to accommodate commercial and residential growth. Development of boat harbors may have especially deleterious effects on wetlands. The creation of San Francisco Bay and San Pablo Bay NWRs and the state WMAs on the Petaluma Marshes and San Pablo Bay will go a long way toward assuring perpetual protection for remaining wetlands. It appears at present that existing tidal marsh is secure but diked former tideland are vulnerable to fill and development.

Other potential threats include severe water quality problems caused by significant reductions in freshwater inflow to the Bay from the Sacramento-San Joaquin River Delta and other streams, industrial and nonpoint pollution problems, and oil spills from ships. Such a spill in 1970 killed hundreds of water birds and polluted Bay wetlands.

Photo 53. Diked tidelands are vulnerable to fill and development--South San Francisco Bay.



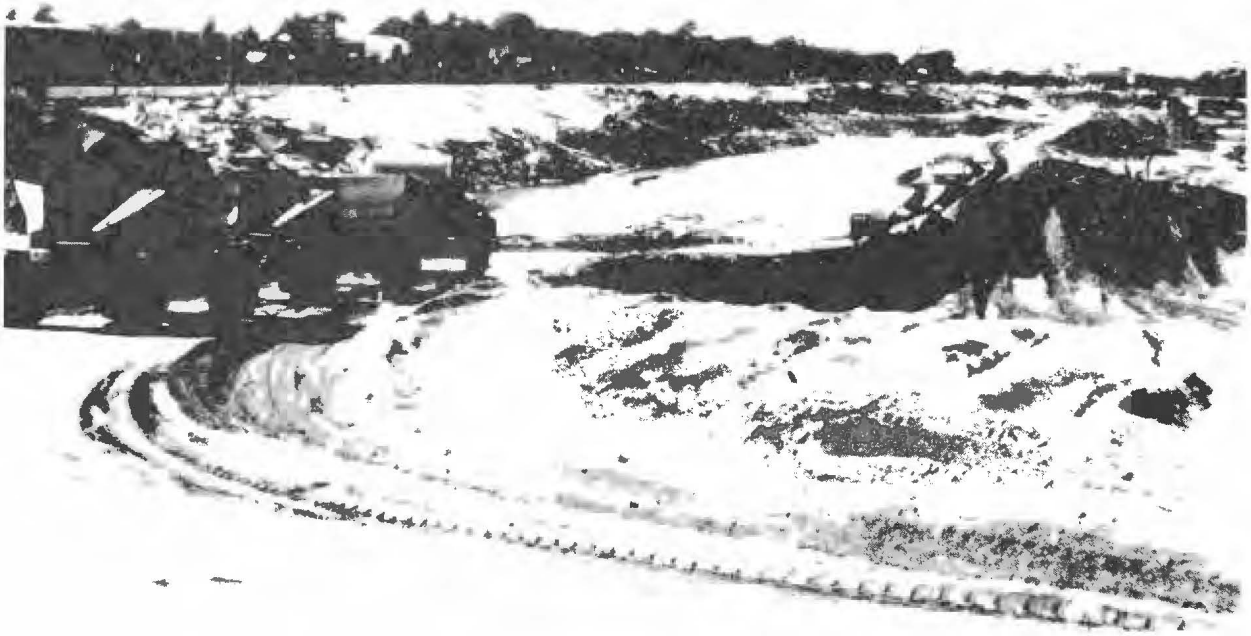


Photo 54. Diked tidelands are used for sanitary land fill--San Francisco Bay.



Photo 55. San Francisco Bay marshland has been lost to housing and marina development--San Rafael and Novato Creek marshes.

4. Central Coast Region

Habitat change information is lacking on the numerous Central Coast Region wetlands. Many have been degraded by residential development on the uplands surrounding the marshes, and diking to create pasture for cattle grazing. About 50 percent of the marshlands of Elkhorn Slough have been reclaimed or are in various stages of reclamation--mostly for agricultural use and salt production. Tidal action is also blocked from the Old Salinas River channel and Moro Cojo Slough. The salt pond area on the north side of the Slough was reclaimed for salt production 65 to 70 years ago; about 800 acres are involved.

Elkhorn Slough is a proposed NWR and has been nominated for "Estuarine Sanctuary" status as part of the Coastal Management Program. Elkhorn Slough has tremendous potential as a deepwater harbor and for industrial development. Should the preservation efforts fail, then development may be encouraged. Residential development is proposed on the uplands surrounding the Slough. This may necessitate acquisition of upland areas.

Other potential threats to the marsh habitat include water quality problems, industrial and agricultural pollution, and a highway relocation proposal. These threats apply to a significant degree to all Monterey Bay area wetlands. Pescadero Marsh is partially protected in a state park, with future park expansion proposed. Local coastal plans will protect the area and no immediate threats are apparent.

5. South Central Coast Region

Morro Bay has not changed in size significantly since 1870. In fact, the marsh areas have actually increased from 280 to 420 acres, resulting from sedimentation into the open bay. Estimates of Bay size ranging between 2,240 and 2,573 acres have been published. No significant filling of tidelands has occurred at Morro Bay.

The Dune Lakes, Oso Flaco Lake, and the Santa Maria River mouth have not been altered in recent times. In contrast, over 50 percent of the marshlands of Goleta Slough have been destroyed in the last 50 years by landfills, siltation, and drainage works. Although the wetlands themselves are secure, the land surrounding Carpenteria Marsh is almost 100 percent developed as residential, and some wetlands have been lost to dike and fill. Mugu Lagoon originally contained 3,000 acres of marshland. Today, that figure has been reduced to 1,400 acres--a 53 percent reduction.

Photo 56. Moro Cojo Slough wetlands have been diked for agricultural development.

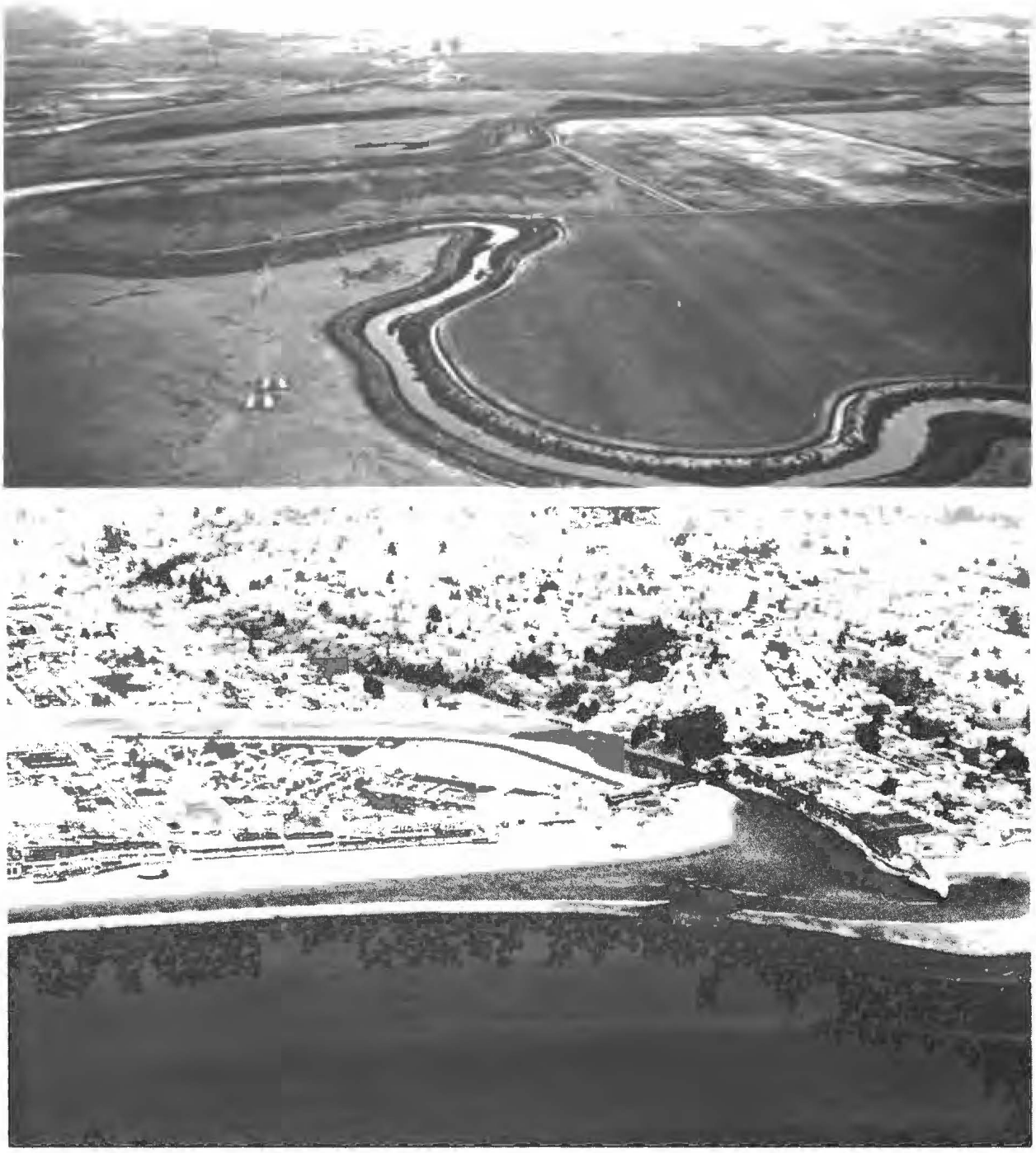


Photo 57. The San Lorenzo River Estuary has been completely surrounded by the City of Santa Cruz.

Photo 58. Urban sprawl has encroached to the edges of the Upper Newport Bay Ecological Reserve.





Photo 59. Upland development threatens Los Penasquitos Lagoon.

The losses resulted from development of a missile facility. Existing Mugu tidal areas on the Navy Base and the 620 acres of private duck clubs present adjacent to Mugu Lagoon are presently secure.

Major future threats to South Central Coast wetlands include increasing recreational use and disturbance, water quality deterioration, water pollution from industrial and agricultural sources, oil spills, residential development, and sedimentation. As with other coastal wetlands, residential and industrial development of uplands surrounding the marshes is of prime significance. Such development increases sedimentation and other water quality problems, recreational use and disturbance, and demand for wetland reclamation to provide boat harbors.

6. South Coast Region

South Coast wetlands have been significantly reduced in size. Many marshes have been completely eliminated, resulting from the tremendous population increase and associated development in the Los Angeles Basin.

The 1,000 acres of Upper Newport Bay are all that remain of the original 13,500 acres of estuary and marsh originally present in the Newport Bay area. Habitat has been lost to dike and fill for residential and industrial development. The 4,600 acres originally present in the Anaheim-Bolsa Chica areas have been reduced to about 1,200 acres--a 74 percent reduction. The present marsh is surrounded with urban-industrial-military development. The conversion of the southern portion of Anaheim Bay into Huntington Harbor occurred in the 1960s and is nearly complete. About 900 acres of wetland were lost in this development alone. Seal Beach NWR encompasses the remaining wetlands in Anaheim Bay. The Santa Ana River estuary has been severely reduced by industrial development.

Potential and continuing threats to South Coast wetlands include deteriorating water quality, industrial pollution and spills, increased recreational use and disturbance, upslope residential development, and increased boat berth demand.

7. San Diego Coast Region

Agua Hedionda Lagoon has been reduced in size by 20 percent since 1928. This has resulted from highway development

Photo 60. San Luis Rey River--marina and housing development has eliminated tidal marsh throughout the San Diego Region.





Photo 61. Los Penasquitos Lagoon tidal habitat has been eliminated by diking, and degraded by power lines and transportation systems.

Photo 62. A shopping center has replaced wetlands in upper Buena Vista Lagoon.



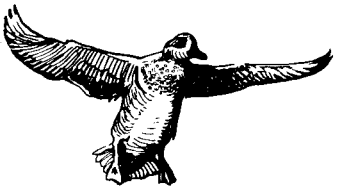


Photo 63. Salt production has eliminated tidal habitat in San Diego Bay.

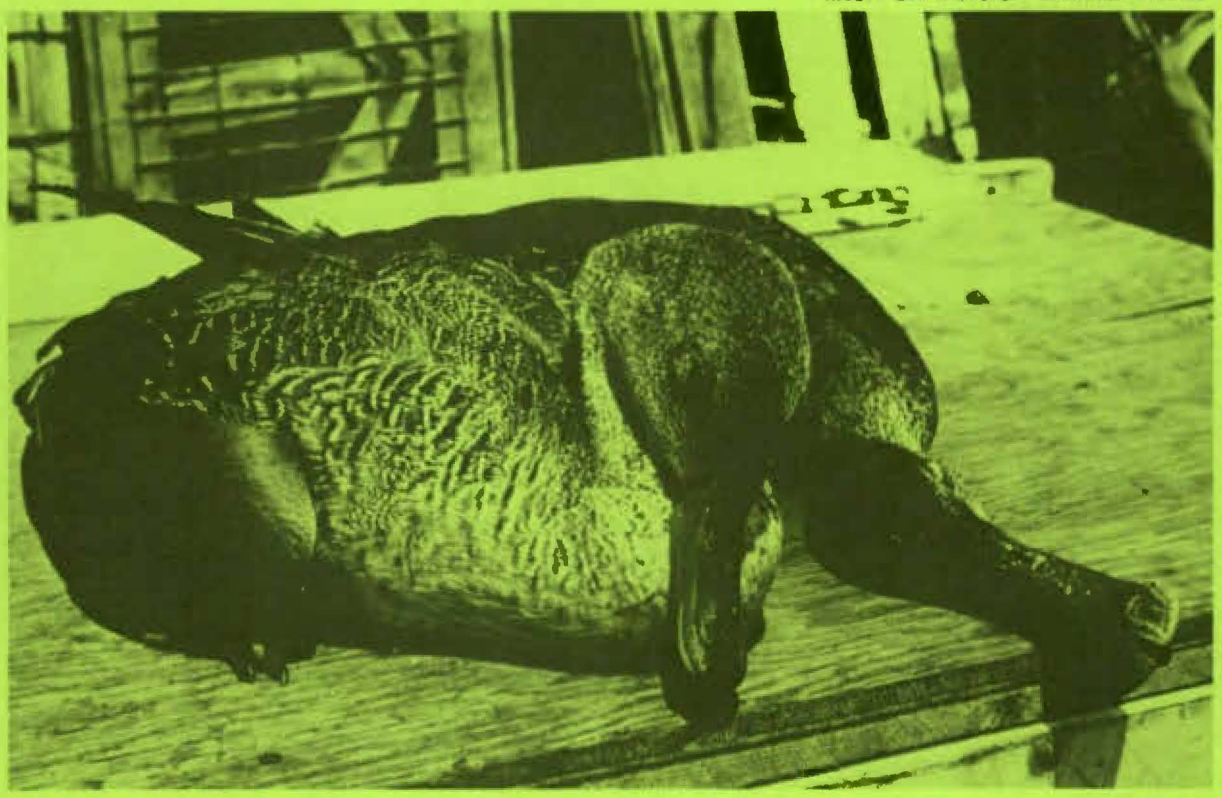
and dredging operations to deepen the Lagoon. Over 50 percent of the once existing marsh was eliminated. San Diequito Lagoon was nearly destroyed to accommodate a racetrack and fairgrounds. About 80 percent of the original 600 acres of salt marsh and waterways have been lost since 1890. Batiquitos Lagoon has not been altered to any great degree. Half of the original tidal value of Los Penasquitos Lagoon has been lost since 1925 to various construction projects.

Natural habitat in and around San Diego Bay has been greatly altered during the past 50 years. Nearly 90 percent of the salt marshes and 50 percent of the mud flats have been lost to Bay fill projects, and virtually all of the upland habitat has been devoted to urban and port development. Mission Bay has been nearly 100 percent urbanized with most wetlands lost. Tijuana Slough has been reduced in size but remains in a fairly natural state.

Major continuing and potential threats to remaining San Diego County wetlands include increasing demand for recreational boating facilities, increased residential development in upland areas draining into lagoons and estuaries, oil and industrial pollution, sedimentation, harbor expansion and development, highway construction, power plant development and blockage of tidal action.



Pintail and Shoveler--Botulism Victims



VI. Habitat Related Impacts

VI. INDICATORS OF HABITAT RELATED IMPACTS ON WATERFOWL

A. How Habitat Losses & Land Use Changes Impact on Waterfowl Use

1. Habitat Loss

Waterfowl are biologically tied to the aquatic ecosystem. It provides food and water, escape from predators, sanctuary, space for normal living activities, and resting and nesting areas. Elimination of this habitat reduces the amount of these resources available to the waterfowl populations dependent upon them, and a reduction in carrying capacity results. Unless neighboring habitat can absorb the displaced birds, which normally results in overcrowding, the total population is reduced by starvation, disease, and lowered breeding output.

2. Changes In Land Use

Land use changes of significance to waterfowl populations using California's coast include conversion of natural tidal marsh to: a) urban-industrial-recreational uses resulting in a total loss of habitat; b) salt evaporation ponds resulting in changes in the species and abundance of birds using the wetland; c) managed fresh or brackish water marsh resulting in changes in the species and abundance on the wetlands; d) diked former tidelands which provide wetland habitat only after winter rains begin; e) blockage of lagoons and bays to tidal action--again influencing species and abundance on the associated wetlands; and f) urban development of uplands surrounding wetlands which affect water bird carrying capacity and water quality.

Conversion of native habitat to residential, industrial, commercial, and transportation developments in the upland drainage basin of wetlands adversely alters the water quantity and quality regimes and sedimentation rates in the wetlands. Most upslope development causes deterioration of existing wetlands and increases demands for harbor development, sewage treatment facilities, power plant construction, and industrial and recreational development within the wetlands--all to the detriment of the waterfowl dependent upon the marsh.

As land use continues to change from tidal marsh to other wetland or non-wetland types, both the abundance and species richness of the affected areas will change as well.

B. Impacts on Waterfowl Populations

Shortages of quality waterfowl habitat in California are well demonstrated by perennial waterfowl disease problems and huge concentrations of birds. Most disease losses occur in the Central Valley, but botulism and fowl cholera losses in coastal habitat account for about 10 percent of the state total.

In the winter of 1975-76, 1,700 waterfowl died of botulism in San Francisco Bay. Almost 2,600 ducks, coots and swans died of cholera in the Humboldt Bay and Lake Earl areas that year. These figures are the actual number of birds picked up. Actual losses were considerably higher. DVE (Duck Viral Enteritus) has occurred twice in the Palace of Fine Arts Lagoon in San Francisco, but to date wild waterfowl have not been affected in any other coastal area. The incidence of waterfowl disease along the coast outside of the two large bays is not known, but losses undoubtedly occur.

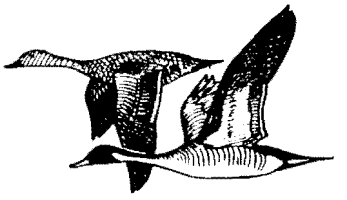
Crowding of waterfowl in small areas increases the likelihood of severe disease outbreaks. The poor habitat conditions associated with remaining coastal wetlands contribute to the frequency and severity of outbreaks. Recent management techniques used to control disease have included drying up infected marsh areas. This technique is used in the Central Valley, but is not practical and may be impossible on coastal habitat. Also, this practice, while controlling disease locally, forces birds onto crowded adjacent areas. Although crowding of waterfowl in small habitat areas is not a severe problem on most coastal habitat, it does occur and may cause stress which lowers resistance to diseases such as cholera.

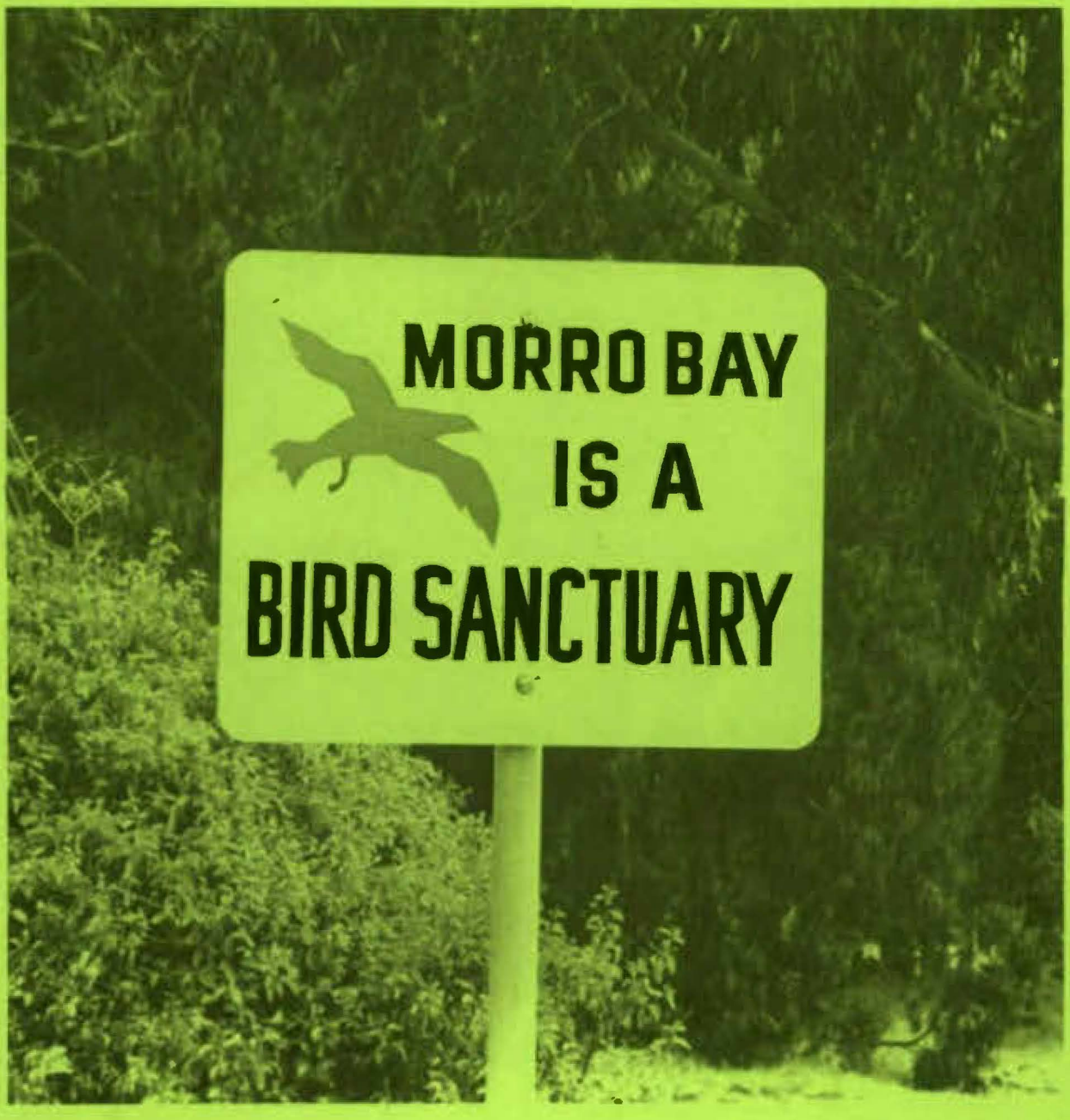
The FWS has recently initiated intensive long-term studies of the waterfowl disease problem in California. Together with CDFG research efforts, these studies are designed to determine total disease mortality, causes of disease outbreaks, and eventually, management schemes to minimize losses.

Crop depredation problems and overcrowding on Central Valley wetlands make it imperative that significant coastal habitat remain intact. During dry years, coastal habitat provides back-up habitat to absorb displaced birds which normally would be using inland wetlands. Continued losses of coastal wetlands will seriously reduce the overall ability of California to support Pacific Flyway waterfowl in present numbers in all years, but especially during drought years.

Continued loss of coastal marshes will adversely impact dabbling and diving duck populations. Dabblers are dependent upon shallow

marshes for feeding; and these areas are vulnerable to loss. Diving and sea ducks will be adversely affected even with their preference for deeper water because the biological productivity of estuaries, bays, lagoons and the ocean depends upon the integrity of the surrounding marshland.





VII. Habitat Preservation Efforts

VII. HABITAT PRESERVATION EFFORTS

A. Acres of Waterfowl Habitat Under FWS, CDFG, and Private Ownership and/or Control

Wetlands considered to be significant waterfowl habitat present in California's coastal estuaries, bays, and lagoons (Table 5) total about 164,000 acres. Table 7 presents the ownership breakdown for coastal wetlands. Most California coastal wetlands are subject to uncertainties of ownership, due to the existence of historic tide and submerged land titles within the marshes and bays. Sovereign public title to the tide and submerged lands within wetlands was acquired by California upon admission to the Union and is still under the jurisdiction of the State Lands Commission. The State retains public titles, which may be fee or may be limited to the public trust easement with private ownership of an underlying fee. Such complicated title problems make it difficult to make a determination of acreages in public and private ownership in many cases. Therefore, contested private and state tideland totals were combined to reflect current title disputes and litigation.

Table 7. Acres of Waterfowl Habitat in Public and Private Ownership

	FWS[1/]	CDFG[2/]	OTHER[3/] FEDERAL	OTHER[4/] STATE/LOCAL	CONTESTED STATE TIDELANDS/ PRIVATE
North Coast	130	1,673	80	5,477	28,483
North Central Coast	0	542	2,371	0	11,250
San Francisco Bay	27,099	11,255[5/]	4,427	1,311	26,363
Central Coast	137	54	0	156	3,128
South Central Coast	0	50	2,142	935	3,433
South Coast	977	1,298	0	0	950
San Diego Coast	0	595	640	2,760	2,210
TOTAL	28,343	15,467	9,660	10,579	75,817

1/ Includes leases from State Lands Commission
2/ Includes leases from State Lands Commission
3/ National Seashores, National Parks, Military Bases
4/ Department of Parks & Recreation; County; City; University of CA
5/ Does not include 3,000 acres of Napa Marsh under cooperative agreement with Leslie Salt.

B. Acquisition Trend and Future State Plans

Both the FWS and CDFG have been active recently in acquiring and/or leasing coastal wetland habitat. The California Department of Parks & Recreation (CDPR) has also been acquiring habitat.

Title complexities have complicated and slowed acquisition progress in many instances. Additionally, several areas have been proposed for acquisition by both FWS and state agencies, causing delays. Designation of Elkhorn Slough as an Estuarine Sanctuary as part of the Coastal Management Program has impeeded acquisition.

The FWS is in the process of making major wetland acquisitions for inclusion in the NWR System in Humboldt Bay (8,000 acres proposed); San Pablo Bay (11,700 acres existing, 4,450 additional acres proposed); and South San Francisco Bay (15,388 acres existing, 23,000 total acres proposed). In addition, the Service is proposing acquisition of Elkhorn Slough, South San Diego Bay, and Tijuana Slough with Land and Water Conservation Funds.

CDFG is purchasing wetlands or proposing acquisition and/or leasing agreements with the State Lands Division in Petaluma Marsh (1,800 acres); Lakes Earl and Talawa, Ten Mile River Estuary, Esteros Americano and de San Antonio; Tomales Bay; Corte Madera Marsh; Napa Marshes; Elkhorn Slough; Morro Bay; Pismo Marsh; Agua Hedionda Lagoon; Batiquitos Lagoon; San Elijo Lagoon; San Diequito Lagoon, and South San Diego Bay.

CDPR has proposed acquisition of parts of Lakes Earl and Talawa, Tomales Bay, Gallinas Creek Marsh, Pescadero Marsh, Morro Bay, Las Penasquitos Lagoon, and Tijuana Slough.

The State Coastal Conservancy was established by the state legislature in 1977 to implement a program of agricultural lands protection, area restoration, public access, and resource enhancement in the coastal zone. Marsh acquisition and restoration in San Diequito Lagoon and Humboldt Bay are included in the list of projects this year.

CDFG currently depends on several sources for wetland acquisition funding. The Fish and Game Preservation Fund is derived from hunting license sales. The State Wildlife Conservation Act of 1947 authorizes acquisition of wildlife habitat and is administered by the Wildlife Conservation Board (WCB). The program is financed by an annual appropriation of the State's share of parimutual (horse racing) revenues. The Marks-Badham Environmental Protection and Research Act of 1970 established the California Environmental Protection Program Fund, with revenue derived by the sale of personalized motor vehicle license plates. This source is used primarily for unique or critical wildlife habitat for Ecological Reserves. The State Duck Stamp Act of 1970 requires waterfowl hunters to purchase a State Duck Stamp before hunting. The funds are used for the acquisition and development of waterfowl habitat. Nearly all monies have been used for production habitat in Canada; however, the Governor recently signed a bill to increase the cost of the stamp with a 50/50 split of funds between Canada

and California. The Bagley Conservation Fund, established in 1971, can be used for wildlife areas. The State Beach, Park, Recreational, and Historical Bond Act of 1974 authorizes issuance of general obligation bonds to acquire and develop recreation and open space land. The Federal Aid in Wildlife Restoration Act of 1937 (Pittman-Robertson or PR) provides funds to the States for wetland acquisition and development, but the State has relied heavily on WCB monies for acquisition of State WMAs.

The Audubon Society and The Nature Conservancy have acquired wetlands in coastal wetland habitat. The Society maintains habitat in Richardson Bay (Part of San Francisco Bay), Audubon Canyon Ranch, and leased tidelands in Bolinas Lagoon; while the Conservancy owns property in Elkhorn Slough. The future coastal acquisition plans of these organizations are unknown at present.

Elkhorn Slough has been nominated as an Estuarine Sanctuary under provisions of the Coastal Zone Management Act of 1972. The State is now eligible to receive 50/50 matching funds to purchase the Slough. The Slough may become a NWR and an Estuarine Sanctuary if current planning is implemented.

Land and Water Conservation Funding (LWCF) will be heavily relied upon for coastal habitat acquisition in the future, as at present. Elkhorn and Tijuana Sloughs, San Diego Bay and the major portion of San Francisco Bay NWR will be purchased with these funds. When the "Unique Ecosystem" Concept Plan is completed for California, several coastal wetland areas will likely be proposed for LWCF acquisition.

C. Effectiveness of State and Federal Legislation/Regulations Designed to Protect Waterfowl Habitat

The FWS, through its Division of Ecological Services, reviews proposals for work and activities in or affecting navigable waters that are sanctioned, permitted, assisted, or conducted by the federal government. These review functions delegated to the Service by the Secretary of the Interior are prescribed by the Fish and Wildlife Coordination Act, the National Environmental Policy Act of 1969, the Estuary Protection Act, the Department of Transportation Act, The Federal Aid Highway Act, the Airport and Airway Development Act of 1970, the Watershed Protection and Flood Protection Act, and Endangered Species Act.

Permit activity under Section 10 of the Rivers and Harbors act of 1899, and Section 208, 402, and 404 of the Federal Water Pollution Control Act Amendments of 1972 are the most common activities to which the FWS applies its review function. The CDFG provides a similar review function with its Environmental Services section.

Rivers and Harbors Act of 1899

Section 10 declares it unlawful to build in any water of the United States or to excavate or fill or in any manner to alter or modify the course, location, condition, or capacity of any navigable water of the United States unless recommended by the Chief of the Army Corps of Engineers and authorized by the Secretary of the Army.

Section 10 permits now also require approval by the Environmental Protection Agency (EPA) as a result of the Federal Water Pollution Control Act of 1972. Navigable Waters of the United States are defined in common and case law as any water that is or has been navigable in fact or is capable of being made navigable through reasonable improvements, including any shoals, falls, rapids, or other interruptions requiring land portage, and which is used or useful in interstate or foreign commerce. The federal jurisdiction on such waters extends throughout their length (in some decisions including non-navigable tributaries) and laterally to the limit of the plane of the mean high water. This is defined on rivers as neither the flood nor the lowest flow stage but the usual high water stage, and on tidal waters as the mean high tide line or on the Pacific Coast, the mean higher tide line.

It has been Service and CDFG policy to object to any nonwater-dependent activity in wetlands, and water dependent activities which will destroy or adversely modify areas of both existing and potential wetlands without adequate compensation.

The tidal wetlands of Coastal California, for the most part, receive protection from Section 10. The aggressive FWS-CDFG program in California is protecting existing tidal wetland acreage in most cases.

Federal Water Pollution Control Act Amendments of 1972 (PL 92-500)

This Act sets up a federal permit system to carry out certain pollution discharge activities in navigable waters. The Act is administered by the EPA and proclaims two goals for the United States--to achieve swimmable, fishable waters wherever attainable by 1983 and, by 1985, to eliminate the discharge of pollutants into navigable waters.

Section 208 of the Act (Water Quality Management) ties together various water pollution control and abatement requirements, including municipal, industrial, residual waste, runoff and ground water pollution control. The Act places the responsibility for developing and carrying out solutions to these problems with state and local

governments. Under Section 208, geographic areas with significant water quality problems are singled out for areawide planning. EPA provides funding to develop the plan to control all point and nonpoint source pollution, and land use as it relates to water quality. Although there is potential to incorporate wetland protection in 208 management plans, 208 planning relates primarily to water quality. Nothing in the Act would prevent landowners from draining wetlands and growing crops, unless a water pollution problem would be the result. It is too early to determine what the effect of 208 planning will have on coastal wetland preservation efforts.

Section 402 of the Act requires permits from EPA for the discharge of any pollutant into navigable waters, the so-called National Pollutant Discharge Elimination System permits. Basically, under this program, it is illegal to discharge any refuse into any navigable waters of the United States. Permits processed under this program have been few, and its value to the protection of coastal wetlands is not presently clear.

Section 404 of the Act greatly expands the traditional Corps of Engineers' permit program (Section 10) to cover all waters of the United States. The Corps, with EPA oversight, regulates the discharge of dredged or fill material in coastal and inland waters and wetlands. Recent amendments to the Act provide for States, if they meet certain requirements, to take over jurisdiction of 404 activities in other than traditional navigable waters (covered by Section 10). The Fish and Wildlife Service's effectiveness in preventing wetland loss under these new amendments remains to be tested. Presently, Section 404 applies to most wetlands of the coast, and an aggressive posture by the Service will insure that no wetlands are lost as a result of allowing poorly-conceived developments under the 404 program.

Executive Orders

Executive Orders are issued, periodically, to formally state executive policy and promulgate executive directives to federal agencies on current issues, thus implementing statuatory law. Such policy directives provide an important source of guidance for federal agency actions. The most recent example of such an order was issued on May 24, 1977, by President Carter and entitled "Protection of Wetlands".

Section 1 (a) reads in part: Each agency shall provide leadership and shall take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the Agency's responsibilities...."; and "...each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there

is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use." This order will not preserve coastal wetlands from other than federally financed or permitted activities, and even federally sponsored destruction is permissable if "no practicable alternative" exists.

The secretary of California's Resource Agency recently issued a similar policy statement. This policy reads in part, "It is the basic policy of the Resource Agency that this Agency and its Departments, Boards, and Commissions will not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands." Exceptions are provided if: 1) the proposed project is water dependent or an essential transportation, water conveyance, or utility project; 2) there is no feasible, less damaging location available; 3) the public trust is not adversely affected; and 4) adequate compensation for project-caused losses is part of the project.

Public Trust

Many wetlands are protected under "Public Trust" and/or "Navigational Servitude." Most of these are located along the coastal areas. Public trust is usually claimed in tidal areas, but its application in associated wetlands is oftentimes in dispute.

The FWS and State of California are identifying wetlands protected under public trust. Results of this effort will have a bearing on future wetland preservation.

California Coastal Plan/Coastal Management Program

Historically, the use of California's coastal wetlands has been regulated or not regulated by local jurisdictions. Over the years, many local, regional, state and federal governmental agencies were given regulatory powers over certain activities within the California coastal zone. As of 1972, California coastal habitats were subject to the jurisdiction of 15 counties, 45 cities, 42 state and 70 federal agencies. Pressures from coastal population expansion, and conflicting coastal resource policy was leading to degradation of coastal environments.

Past efforts to implement effective state and regional coastal planning programs were unsuccessful, except for BCDC. This regional planning body for San Francisco Bay pioneered coastal development regulation. It has been successful in preventing a great deal of dredge and fill projects in San Francisco Bay which would have destroyed waterfowl habitat. No similar commission was established for the entire coast until Proposition 20, the Coastal Conservation Act of 1972, became law. Proposition 20 established state and regional coastal commissions to regulate development

and prepare a permanent, long-range Coastal Plan which was published in 1975. The Coastal Act of 1976 became effective January 1, 1977, permanently establishing coastal planning and regulation of development in California.

The California Coastal Plan of 1975, the operational basis of the Coastal Management Program, identified many coastal marshes, estuaries, bays and lagoons which would be preserved by acquisition or zoning. These areas were designated as "sensitive resource areas." Local Coastal Plans (LCPs) prepared in response to implementation of the management program will reflect the need to protect these areas. Once approved, LCPs become law and the foundation of the Coastal Management Program. Wetlands identified in the approved LCPs as designated for preservation and/or acquisition will be reasonably secure from loss. Management of such areas remains a question; but, presumably, FWS, CDFG, CDPR, counties and cities will be involved. The Coastal Management Program offers the best hope for long-term protection of California's existing coastal wetlands.

Restorable wetlands (diked former tidelands) may not be accounted for in the LCPs. Also, the Corps of Engineers does not always exercise its jurisdiction to prevent wetland losses behind dikes. If such areas are designated for development, their potential for restoration will be permanently lost. Acquisition of restorable areas will be of critical importance to waterfowl habitat in many locations along the coast and will be a major part of the proposed acquisition program (see Section VIII).

Summary

FWS involvement in the Section 10, 208, 402, and 404 programs, enforcement of the public trust, and coastal zone planning by the state have been reasonably successful in recent years in nearly eliminating development in existing tidal wetlands along the coast. This involvement has obtained suitable mitigation in most instances where unavoidable losses occurred.

In most cases, reliance on these permit programs for the protection of most tidal wetlands appears to be advisable, thus freeing up acquisition funds for other projects. The Coastal Plan and Management Programs offer an exceptional opportunity to preserve wetlands through zoning. However, some form of federal and/or state involvement in the preservation of wetlands on California's coast appears to be appropriate in many instances, such as nontidal wetlands not under state or federal permit jurisdiction, and where specific management activities are needed.

D. Total Acres of Waterfowl Habitat Remaining Unprotected

Considering the existence of the State Coastal Commission, the various permit laws designed to protect coastal wetlands, public trust rights, State Land Commission held tidelands, the increased public pressure to protect coastal wetlands, and stepped-up acquisition efforts of the FWS and CDFG, California coast waterfowl tidal marsh and open bay habitat would appear to be well-served. Trying to define what "unprotected" waterfowl habitat consists of--given the current high degree of legislative and administrative interest--is difficult, if not impossible, at this point. Legal disputes between private individuals and the State Lands Commission over title to tidelands is of significance to waterfowl habitat. Certainly, wetlands under state title are secure. Of the acreages listed in Table 7, only the 75,800 acres in private or contested ownership would be the unprotected part. However, once ownership is resolved, this figure will decrease. In any case, most existing tidal marsh is by all accounts in little danger of loss.

However, the integrity of a wetland cannot be measured by the surface area of the water alone. The surrounding uplands and drainage basin are of equal importance. This part of the wetland complex is largely privately owned and, therefore, unprotected. The exact acreage of surrounding uplands of all the wetlands is unknown, but it is considerable. A major thrust of this plan will be to point out that uplands should be considered for acquisition in many instances during ascertainment studies--even though the wetland, per se, is protected in some fashion. It does little good to protect the wetland if industry and housing develops right to the water's edge. This has happened in many areas.

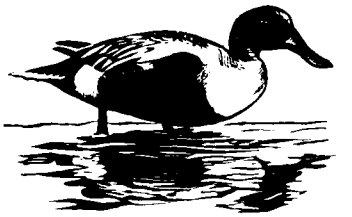
Another important fact of coastal wetlands is the existence of several thousand acres of diked former tidelands which if restored would again provide productive marsh. These diked tidelands, which retain some waterfowl values, are more vulnerable to loss from fill than existing tidal marsh because the Corps of Engineers does not always exercise jurisdiction behind dikes. Significant migratory bird benefits could be realized through acquisition and restoration of these areas.

E. Conclusions Concerning Long-Term Protection of Habitat

Development pressures are so high along the California coast that many wetlands would not exist except for past and ongoing acquisitions, vigorous coastal zone planning and regulation, and the aggressive FWS and CDFG posture relative to Sections 10, 404 and other permitting activities. These zoning and legislative protective devices have been so effective that the long-term protection of most of the existing tidal wetland habitat is assured without acquisition.

However, it is in the area of marsh restoration in diked former tidelands and protection of uplands that the future is not so secure without fee or easement acquisition.

Because most existing tidal marsh is secure, a greater benefit to migratory birds and a more effective use of duck stamp funding will be realized from acquisition and development of restorable tidal marshes.



Petaluma Marsh tidal habitat



VIII. Proposed FWS Habitat Preservation Objectives

VIII. PROPOSED FWS HABITAT PRESERVATION OBJECTIVES AND STRATEGY FOR THE CALIFORNIA COAST

A. Preservation Objectives

1. General

The FWS has initiated the new Migratory Bird Wetland Preservation Program for the Pacific Flyway, including the coast of California. The first phase of the program identified, evaluated, and prioritized coastal wintering waterfowl habitat. This evaluation was directed toward existing habitat, uplands surrounding marshland, and areas where opportunity exists to restore marsh habitat in diked tidal wetland areas. Waterfowl habitat within each of the coastal regions and the San Francisco Bay area was identified and evaluated, and lists of wetlands in need of protection were developed.

Federal and state waterfowl biologists participated in the evaluation sessions. Additionally, the views and comments of private conservation organizations and individuals were solicited and incorporated in the identification, data collection and/or evaluation.

It is believed that all wetlands significant to waterfowl have been identified for inclusion in this Plan. However, if the upcoming FWS National Wetlands Inventory, or other source of information, discloses additional wetlands of importance to waterfowl, they will be incorporated in the long-term planning for habitat preservation. Especially significant in this regard would be newly developed waterfowl census data indicating an area important which originally had been overlooked

The second phase of the evaluation process was to determine which areas required federal involvement for preservation, and if required, the manner of the involvement. The results of this analysis indicated that existing tidal marshes of importance to waterfowl are presently secure because of current public acquisition programs already underway; or because of the effectiveness of coastal zone planning, various permit requirements, and the aggressive posture of the FWS's Division of Ecological Services and the CDFG's Environmental Services section. Public opinion of coastal communities strongly favors preservation of coast wetlands.

It is diked former tidelands, which may be dry or support degraded marsh, which are in most need of protection because their importance as potential wetlands is not recognized. The Corps of Engineers still grants large development projects

behind dikes, local and state coastal plans may not take into account the potential wetland value, and current acquisition by the CDFG and FWS has focused on existing tidal marsh and mud flats.

As a result of this situation, there are only a very few cases where acquisition of existing wetlands, beyond that already proposed, is justified in the coastal zone. By far, the greatest benefit to waterfowl and other migratory birds, and the most effective and efficient use of the MBCA funds, would be made by acquiring diked former tidelands and restoring them to tidal marsh or mud flats. (In some cases, it may be most beneficial to develop a managed fresh or brackish marsh). Specific justification follows: 1) Existing tidal habitat is not sufficient to meet current and future waterfowl needs along the coast because of past and continuing losses; 2) Existing tidal marsh is secure. Acquiring it will not provide any benefit to migratory birds over those already existing unless intensive management was applied; 3) Increasing the coastal wetland base will help ease the general habitat shortage in California; 4) Coast habitat is very important, especially in dry years, as back-up wetlands for the Central Valley. An increase in this habitat is desirable; 5) Increasing coastal habitat will encourage a wider distribution of waterfowl populations, reduce disease losses, and provide additional feeding and resting areas; 6) It may be relatively inexpensive to rehabilitate former marshland in many instances. Simple breaching of dikes may suffice, but replenishment of subsided marsh soils, construction of water control structures, and establishment of appropriate aquatic plants may be required. There may be a problem with some restoration sites, because many exterior dikes provide flood control for landward development. New flood control improvements would have to be constructed if dikes were breached.

This recommendation is consistent with current acquisition policy which gives acquisition of land to restore previously destroyed habitat a lower priority unless, a) the restored habitat will serve high priority migratory bird population needs at a cost/benefit ratio more favorable than acquisition of existing habitat, or b) existing habitats are insufficient to meet population needs. Restoration of California coastal wetlands meets criteria a and b because wintering habitat is in short supply. One of the highest migratory bird population needs in California is to increase the amount of wintering habitat. Acquisition of existing marsh will not meet this goal because this habitat is secure. Increasing the carrying capacity of existing wetlands may be more expensive than restoring new areas.

Additionally, protection of uplands surrounding existing or potentially restorable marshland has been found to be a critical factor in many instances. Such protection will be a part of the proposed program objectives outlined below: These objectives in order of priority are:

1. To continue ongoing and authorized NWR acquisition and development as originally proposed. This includes preservation of existing tidal marsh and mud flats, and restoration of diked former tidelands. Such lands would be included in the National wildlife Refuge System..

2. To initiate ascertainment studies to determine the feasibility of acquiring and restoring diked former tidelands to productive tidal and/or managed marsh for inclusion in the National Wildlife Refuge System.

3. To initiate ascertainment studies to determine the feasibility of preserving, by fee or easement acquisition, upland areas surrounding existing and restorable former tidelands where necessary to maintain wetland integrity.

4. To initiate ascertainment studies to determine the feasibility of preserving existing tidal marsh by fee acquisition or lease in conjunction with restoration projects where management of the resulting habitat unit would be facilitated, and/or where a threat of loss becomes evident.

5. To initiate ascertainment studies to determine the feasibility of preserving existing nontidal wetlands for inclusion in the National Wildlife Refuge system.

Criteria used to evaluate wetlands are presented in Appendix C.

2. Acquisition Objectives (Ongoing and Authorized Projects)

Table 8 presents those existing tidal or other wetlands taken from the comprehensive list of areas with waterfowl value (Table 5) which are in the process of being acquired with duck stamp funds. It is proposed that acquisition of these areas continue to completion.

The remaining wetlands from Table 5 which consist of existing tidal or other marsh are of value to waterfowl but they are protected already through coastal zone planning or permit authorities, being purchased by state agencies, proposed for acquisition using LWCF funds, or do not support large waterfowl populations relative to flyway and state needs for wintering habitat. Consequently, MBCA funding is not needed or suitable.

Appendix E provides rationale for including or rejecting wetlands for the final acquisition list.

Table 8. Ongoing and Authorized Projects Proposed for Continued MBCA Acquisition

Area	Acres[1] Already Acquired/Leased	Acres Remaining[1] to be Acquired Leased	MBCA Proposed Additional Acquisition of Tidal Marsh and Mud Flats
SF Bay NWR	15,388[2]	7,600[2]	2,000[3]
San Pablo Bay NWR & Napa Marshes[6]	11,711	4,450	1,500[3]
Humboldt Bay NWR	130	8,600	4,000[3]
Lake Earl-Talawa[4]	0	0	5,500[5]
Petaluma Marsh[4]	1,800	600	0

1/ Acreage figures include existing tidal marsh, mud flats, and diked lands such as salt ponds and agriculture.
2/ LWCF funds.
3/ In conjunction with restoration projects and/or if a threat developes.
4/ CDFG proposed or ongoing acquisition; FWS involvement only if needed.
5/ Nontidal, freshwater.
6/ FWS and CDFG will both be involved in this area.

Appendix D provides a habitat photo of each of the ongoing acquisitions and supporting data. Each area is described below.

a. South San Francisco Bay

A 23,000 acre NWR is being acquired with LWCF funds by the FWS at present. About 15,400 acres have been purchased with an additional 7,600 planned. About 2,000 acres of tidal marsh will remain outside the refuge at its completion. It is proposed to study the feasibility of adding this acreage to the refuge at a later date in conjunction with restoration additions or if a threat developes.

b. Napa Marshes San Pablo Bay

An 11,700 acre refuge exists presently, and an additional 4,450 acres, including 840 acres of salt marsh, has been authorized. Another 1500 acres of tidal marsh and mud flats will exist outside the refuge at completion

of the authorized addition. It is proposed to study the feasibility of adding this acreage to the refuge in conjunction with restoration additions or if a threat developes.

c. Humboldt Bay

A NWR of 8,735 acres is presently being acquired of which about 7,300 acres is open, tidal marsh and mud flats. About 4,000 more acres of tidal habitat will remain after the refuge is in place. It is proposed to study the feasibility of adding this acreage to the refuge if a threat developes or in conjunction with a restoration addition.

d. Lake Earl-Talawa

Lakes Earl and Talawa support large populations of waterfowl, especially canvasbacks. The CDFG and CDPR have proposed acquisition of the area and if the purchase proceeds smoothly, it is not proposed that the FWS get involved. Should the state be unable to proceed, it is proposed that the FWS study the feasibility of acquiring the area.

e. Petaluma Marsh

This is the largest block of tidal marsh left in the San Pablo Bay area. The state has acquired 1,800 acres recently, and may acquire the remaining tidal marsh. It is proposed that the FWS not get involved in acquisition of existing tidal marsh unless the state is unable to proceed or a threat developes which cannot be met by the state.

3. Restoration/Development Objectives

Perhaps the greatest opportunity for maintaining and enhancing waterfowl populations in the California coastal zone rests with the restoration of diked former tidal marsh. There is a significant acreage available for this type of restoration.

Often viable, though degraded, marsh exists behind dikes. It is these--not the existing tidal marsh--which are in most danger of being lost permanently because of their vulnerability to fill for proposed developments. Legislative and administrative mandates to protect coastal wetlands do not always include marshes behind dikes.

The tremendous potential to add extensive acreage of tidal marsh to that already existing, coupled with the relative security of the existing tidal marsh, make the restoration option highly attractive. Exercising this option will provide great dividends to waterfowl populations using coastal habitat.

The FWS and CDFG have identified several areas where creation and development of new NWRs and/or WMAs are biologically appropriate. These are all areas which, at one time, contained significant tidal marsh subsequently lost to reclamation for agriculture, salt production, industry, and housing. Some of the areas retain marsh while others are essentially dry. Fortunately, many of the marshes diked in preparation for development have not yet been filled; thus, an opportunity for restoration is still available. Table 9 presents a list of coastal wetlands which have significant acreage of restorable, diked former tidelands. It is proposed that ascertainment studies be initiated to determine the feasibility of projects to restore this marsh. This is top priority for coastal waterfowl habitat preservation.

Table 9. Proposed Fee Acquisition and Restoration of Diked Former Tidelands Listed in Order of Priority for Acquisition and Development.

	Area	Estimated Acreage Potentially Restorable*
1.	Napa Marshes	20,000
2.	Petaluma Marsh	1,500
3.	Gallinas Creek Marsh	800
4.	Novato Creek Marsh	2,400
5.	San Rafael Marsh	250
6.	North Richmond Marsh	400
7.	South SF Bay	20,000
8.	Humboldt Bay-Mad River Slough	1,200
9.	Bolsa Chica-Santa Ana River Marshes	800
10.	Moro Cojo Slough-Old Salinas River	1,000
11.	Tomales Bay	500
12.	Eel River Delta	1,500

*Note: This is not necessarily a proposed acreage. Acquisition acreages are to be proposed in Ascertainment Reports.

Descriptions of each area are presented below.

a. Napa Marshes

This area has been reduced substantially by diking for salt production and agriculture. It is the largest

potential marshland in North San Francisco Bay, and restoration of tidal action would greatly improve the habitat base for waterfowl and other wildlife in the Bay area. It is proposed that ascertainment studies proceed to determine the feasibility of restoring tidal wetlands, other than those within the authorized boundary, for inclusion in San Pablo Bay NWR.

b. Petaluma River Marsh

The CDFG is presently acquiring a large percentage of the existing tidal marsh. However, a large portion of the original marsh has been reclaimed for agriculture. Restoration of these lands to tidal marsh, when added to the existing area, would significantly enhance this waterfowl area. It would be of special importance to canvasbacks. It is proposed that ascertainment studies proceed to determine the feasibility of restoring tidal wetlands.

c. San Rafael Creek Marsh

Much of the former tidal marsh here, too, has been reclaimed. Restoration of tidal action would provide significant habitat for waterfowl and other wildlife. In addition, the large block of former tidelands present is severely threatened with fill and development. A viable marsh exists behind the dikes and will be lost without acquisition. It is proposed that ascertainment studies proceed to determine the feasibility of restoring tidal wetlands for annexation to San Pablo Bay NWR.

d. Gallinas Creek Marsh

Like other San Francisco Bay marshes, Gallinas Creek Marsh has been reduced substantially by dikes and fill. A large portion of diked tidelands remains and, with acquisition and restoration, could be returned to productive waterfowl habitat. It is proposed that ascertainment studies proceed to determine the feasibility of restoring tidal wetlands for annexation to San Pablo Bay NWR.

e. Novato Creek Marsh

The flood plain of this creek has been radically altered for agriculture and development. Most of the former marsh is now behind dikes. Restoration of a significant portion of these diked tidelands would greatly increase waterfowl habitat in the San Francisco Bay area. It

is proposed that ascertainment studies proceed to determine the feasibility of restoring tidal wetlands for annexation to San Pablo Bay NWR.

f. North Richmond Marsh

The existing tidal marsh is secure, but degraded. Past diking and land filling operations have destroyed much of the habitat. It is proposed that ascertainment studies be initiated to determine the feasibility of restoring marsh and possibly annexing it to San Pablo Bay NWR.

g. South San Francisco Bay

Most of the tidal marsh in South San Francisco Bay has been converted to salt production ponds, agriculture, or housing-industrial-commercial development. Much of the salt pond acreage is being acquired for San Francisco Bay NWR at present. Because the ponds will remain in salt production until Leslie Salt Company divests itself of the salt business, it is proposed that ascertainment studies proceed to determine the feasibility of acquiring other diked former tidelands outside of the present 23,000 acre borders which could be restored to tidal action. Such acquisition would be included in the San Francisco Bay NWR.

h. Humboldt Bay

Most of Humboldt Bay's tidal marsh has been diked or developed. This area is already one of the most important waterfowl areas on the coast, and restoration of significant tidal marsh would greatly enhance the habitat base, providing for increased waterfowl use. It is proposed that ascertainment studies proceed to determine the feasibility of a restoration addition after acquisition of the proposed Humboldt Bay NWR is completed.

i. Bolsa Chica-Santa Ana River Mouth

Part of Bolsa Chica is in a CDFG ER at present, and the remainder is in oil development, as is the Santa Ana River Mouth. A majority of these areas could potentially be enhanced with a restoration project. It is proposed that ascertainment studies proceed to determine the feasibility of restoring these tidal wetlands.

j. Moro Cojo Slough-Old Salinas River

Significant freshwater marsh exists in the flood plain of Moro Cojo only in wet years; at other times it is reclaimed for agriculture and pasture. Acquisition and development could provide a significant addition to the waterfowl habitat in the Monterey Bay area. Much of the floodplain of the Old Salinas River has also been reclaimed. It is proposed that ascertainment studies be initiated to determine if a restoration program is feasible.

k. Tomales Bay

CDFG has acquired an Ecological Reserve on the Bay and local and state interest will serve to protect existing wetlands. Several hundred acres of former tidal marsh could be restored. It is proposed that ascertainment studies be initiated to determine the feasibility of acquiring and restoring marsh.

l. Eel River Delta

The Eel River Delta provides habitat for large waterfowl use at present. This use could be significantly increased with acquisition and restoration of original marsh in conjunction with Humboldt Bay NWR. It is proposed that ascertainment studies be initiated to determine the feasibility of such a project.

4. Upland Acquisition Objectives

Most wetlands on California's coast are protected in some fashion; however, often the surrounding uplands and drainage basins are not. As a result, industrial-urban development encroaches up to the wetland boundary, eliminating waterfowl values.

It is proposed that all wetland areas proposed for ascertainment study and potential acquisition and/or restoration also be studied at the same time to determine the need for preservation of the upland areas.

It is also proposed that uplands surrounding wetlands which are already protected in the public trust or in fee ownership by FWS, CDFG, CDPR, etc., be studied as time allows to determine the need for protection.

5. Existing Nontidal Marsh Objectives

The following waterfowl habitat areas (Table 10) have been identified as existing nontidal wetlands, which are in need of protection beyond that provided by coastal planning and permit authorities. Ascertainment studies will be initiated as time allows.

Table 10. Existing Nontidal Wetlands Proposed for Preservation with MBCA Funding Listed in Priority Order.

	Area	Proposed Acquisition Acreage
1.	Dune Lakes-Oso Flaco Lake Area	1,400
2.	Whelan Lake-San Luis Rey River	160 plus
3.	McClusky Slough	250
4.	Mugu Lagoon Area	620

Each area is described below.

a. Dune Lakes - Oso Flaco Lake

The area is a unique complex of sand dunes and freshwater ponds and lakes important to waterfowl in the South Central Coast Region. It has been proposed for protection under the Unique Ecosystems Program. The lakes proper are currently operated as duck clubs and should be preserved along with the dunes surrounding them. It is proposed that ascertainment studies be initiated to determine the feasibility for protecting this area with MBCA funding.

b. Whelan Lake-San Luis Rey River

This reservoir in the San Diego Region supports a large flock of wintering Great Basin Canada geese and several thousand ducks. It is the desire of the present landowner to see the area remain a sanctuary. It is proposed that ascertainment studies be initiated to determine the desirability and feasibility of acquiring this area, along with the San Luis Rey River Corridor.

c. McClusky Slough

This wetland in the Elkhorn Slough area adjacent to the Pajaro River mouth is presently a duck club. Good

habitat can be present, but the area needs additional water for optimum wetland development. It is proposed that ascertainment studies proceed to determine the feasibility of acquiring the area. The desirability of securing a large area to include the Pajaro River mouth should be considered.

d. Mugu Lagoon Area

Mugu Lagoon proper is secure, as it is within the Navy's Pacific Missile Range. About 600 acres of adjacent duck club habitat is also secure, but could be included in a conservation easement program if a threat developes in the future. It is proposed that ascertainment studies be initiated at that time to determine the desirability and feasibility for such a protective program.

B. Cost To Achieve Objectives

1. Ongoing Acquisition Objectives

The costs for ongoing and proposed acquisitions of existing tidal marsh and mud flats are presented in Table 11. These are rough estimates only, and are subject to changes.

Table 11. Estimated Costs for Authorized and Ongoing Acquisition Projects

Area	Acres Remaining to be Acquired/ Leased MBCA	Cost of[3] Remaining Acquisition	Proposed Additional Acquisition of Tidal Marsh & Mud Flats (acres)	Cost of[3] Proposed Addition
1. South SF Bay			2,000[4]	1.0 million
2. San Pablo Bay NWR	4,450	2.2 million	1,500[4]	750,000
3. Humboldt Bay NWR	8,600	1.5 million	4,000[4]	2.0 million
4. Lake Earl-Talawa	0	---	5,000[5]	2.75 million
5. Petaluma Marsh[2]	600	300,000	none	---

[1] LWCF funds

[2] CDFG proposed or ongoing acquisition

[3] Cost figures represent funds spent for acquisition of private marsh and farmland. State tideland leases are obtained at no cost.

[4] Acquired in conjunction with restoration projects and/or if a threat developes.

[5] Nontidal freshwater wetland

2. Restoration Objective

The costs for the restoration objectives (Table 12) must be considered as very rough estimates, subject to significant changes during ascertainment studies, because they are based upon rough estimates of the acreage of potentially restorable wetlands and reflect only acquisition cost, not development. Acreages have not been verified with aerial photography. The ascertainent process will identify specific project boundaries and acreages, and development (restoration) costs. In general, diked lands will be much more expensive to acquire than existing tidal marsh.

Table 12. Estimated Cost For Proposed Acquisition of Restorable Wetlands

	Area	Acres	Cost ($)
1.	San Francisco Bay Area Wetlands	45,350	22.68 million
2.	Humboldt Bay Area Wetlands	1,200	600,000
3.	Bolsa Chica-Santa Ana River Mouth	800	400,000
4.	Moro Cojo-Salinas River Area	1,000	500,000
5.	Tomales Bay	500	250,000
6.	Eel River Delta	1,500	750,000
		TOTAL	25.18

3. Upland Acquisition Objectives

It is not possible to estimate costs for upland acquisition at this point because the required acreages for each wetland area, and the wetland areas requiring upland protection are not yet known. Ascertainment studies will develop and provide this information.

4. Existing Marsh Acquisition Objectives

The estimated costs for acquisition of the few existing marsh areas is presented in Table 13. These are very rough estimates, which will change during ascertainment studies.

Table 13. Estimated Costs For Acquisition of Existing Nontidal Wetlands

	Area	Acres	Cost
1.	Dune Lakes-Oso Flaco Lake	1,400	700,000
2.	Whelan Lake-San Luis Rey R.	160	80,000 plus**
3.	McClusky Slough	250	125,000
4.	Mugu Lagoon Area*	620	310,000
		TOTAL	1,215,000

*Mugu duck club habitat ascertainment studies will be undertaken only if a threat developes in the future.

**Exact cost not known, because acreage to be included in San Luis River Corridor is not known.

C. Criteria Used To Evaluate Habitat

Identification and ranking of wetlands of importance to waterfowl and the threat of loss of those wetlands normally involve the use of a checklist of criteria (waterfowl use data; habitat types and quality, etc.) and numerical scores assigned to each criteria, based on the relative values of each wetland (e.g., one to ten). Wetlands receiving the highest total score in the biological value category would be ranked first. Those scored highest in the threat of loss category would be in most need of protection. Often, a combination of the two major categories is used to produce a combined final ranking. Score ranges would then be compiled to place wetlands in several preservation classifications for priority of ascertainment work. These procedures were used to rank wetlands in the Central Valley.

Where data are adequate, this detailed ranking process is the most efficient approach; but where the waterfowl use data for each wetland varies in quality and quantity, the ranking process breaks down. Under these circumstances, one wetland could be rated accurately in every category and, thus, receive a higher ranking than an equally valuable wetland of which little or no data are available.

With few exceptions, adequate waterfowl use data are not available for California coastal wetlands. Existing data are woefully inadequate to assign relative importance values to the approximately 150 different coastal estuaries, lagoons, and freshwater ponds. Not only are total survey data for each area lacking, but the most important species using each area are not known--except in a general sense. This absence of basic information about coastal wetlands is a serious impediment to the detailed analysis and evaluation of the biological importance of the coastal wetlands to waterfowl. Knowledge concerning threat of loss is a little better known, but not complete enough to make firm judgments on a quantitative basis.

As a result of the data shortcomings described, an approach to the ranking process was used which relied upon the general knowledge and professional judgment of FWS and CDFG field and staff migratory bird and waterfowl management personnel. Several biologists from each agency met to discuss waterfowl values along the coast and choose from a list of all coastal wetlands those areas of obvious importance to waterfowl. While this is far from the ideal system--given the variable or nonexistent quantitative waterfowl information available for the coast--this was the only practical approach.

This process reduced the original list of wetlands from about 150 to 45 with recognizable waterfowl value, irrespective of their relative importance to Pacific Flyway habitat needs or their need for protection. This list was further reduced after taking into account current status, ownerships, overall waterfowl value relative to flyway populations, and threat of loss. The analysis indicated that many of the coastal wetlands are too small, already protected in some fashion, or have high endangered species or unique ecosystem values, with acquisition likely under different funding programs. At this time, it appears that most coastal wetlands in need of federal protection would best be preserved with LWCF because of their endangered species or unique ecosystem aspects. A great many unknowns remain, however.

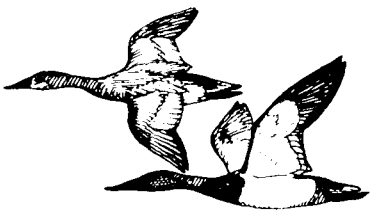
One problem with the identification session involved frame of reference. Overall waterfowl use along the coast is low--less than five percent of Pacific Flyway birds are recorded here during the mid-winter period. For certain species, this percentage jumps to 100%, but populations of even these key species are relatively low. Most waterfowl biologists deal in millions of pintails or hundreds of thousands of geese on Central Valley wetlands. A marsh area holding a hundred thousand snow geese and half a million pintails is obviously important. But what of a 100-acre coastal estuary providing habitat for a few hundred buffleheads, goldeneyes, and/or redbreasted mergansers? The importance of that estuary in maintaining this number of birds relative to total flyway populations of that species may be just as significant as a 10,000-acre inland marsh holding 500,000 dabblers.

Also, key species utilizing coastal habitat are quite different from those frequenting inland wetlands. Very few geese use the coastal zone. (The Aleutian Canada goose and pacific brant are notable exceptions). Except for canvasbacks, scaups, pintails, wigeons, teals and shovelers, heavy waterfowl use along the coast is represented by species not important to hunters. As a result, there has never been a pressing need to collect data on these other species, and all important habitat areas are not known.

Appendix C presents a detailed list of the criteria considered and applied to arrive at the final list of wetlands appropriate for duck stamp funding.

D. State Views on FWS Program

The CDFG supports the wetland preservation program presented herein. State biologists have devoted a significant amount of time and effort in aiding the Service in its development of the Concept Plan. The state's own preservation efforts constitute an active program and have been used as a framework within which the FWS program has been developed. This will greatly aid the attainment of acquisition goals for the coast. The CDFG will be involved at the outset in all easement and fee acquisition efforts by the FWS described in this plan. The FWS and CDFG preservation efforts will be highly complementary in the next ten to fifteen years.



Common Goldeneyes



IX. Alternative Strategies

IX. ALTERNATIVE STRATEGIES FOR WETLAND PRESERVATION

It is current FWS policy to acquire land by fee or easement only when other means of achieving wetland preservation goals and objectives are no longer available and/or effective. There are several methods available, but each has a different level of effectiveness relative to the large scale of the coast wetland preservation effort presented herein. The prime benefit of using other funding sources is that of reserving duck stamp funds for other high-priority wetlands that might not otherwise be protected. Easements are preferred over fee acquisition (if an adequate degree of protection can be assured), because more habitat can be preserved for each dollar spent, and long-term operation and maintenance funding responsibilities associated with a NWR are not incurred.

Other possible strategies include reliance on the comprehensive land use planning and zoning laws of the Coastal Management Program with attendant Local Coastal Plans; existing regulations, such as Section 10, 208, 402, and 404 Permit Programs; gifts; private or state acquisition; jurisdictional transfers; formal agreements with wetland owners; dedications; nominations of Estuarine Sanctuaries under the Coastal Management Act; and, finally, legislative actions at the state or federal level. All of these methods have been used in the past and are currently in use to preserve wetlands on the coast of California. Although most of the wetlands can be protected with these mechanisms, and many have been so protected, heavy reliance on any one of the above to accomplish the specific FWS wetland preservation and restoration objectives presented herein is not realistic for several reasons: (1) There is not enough money in these other programs to achieve all the FWS preservation goals; (2) Most methods--such as donations, transfers, agreements, and legislation--are erratic in their applicability, while implementation of the Service program depends upon a planned, organized approach; (3) The Service has ultimate responsibility for the nation's waterfowl resources, and the present program reflects a flyway-wide perspective. Local governmental bodies cannot be expected to have this same perspective so do not feel the required urgency to act. Local or regional actions are usually piecemeal, with no overall plan. Past history has shown that while some communities value their wetlands, most do not, and the wetlands have been lost. The Coastal Management Program should alleviate this problem to a large degree; (5) While comprehensive land use planning could protect wetlands, development and agricultural interests usually dominate planning. Zoning laws change and cannot guarantee preservation of the wetlands forever; (6) Restoration of diked, former tidelands cannot be achieved with any of the above (except CDFG and CDPR acquisition); (7) Preservation of uplands surrounding coastal tidelands cannot be achieved with the above (except CDFG, CDPR, and Coastal Zone Management).

California's Williamson Act is used to place agricultural lands in more favorable tax status as agricultural preserves. This law could be strengthened to include relief for wetland preservation. The FWS supports such amendments, and this act should be used where possible. However, the Act has not worked as well as it should even for agricultural lands in some areas. Also, it is not a permanent solution. It would not insure that a piece of habitat would remain as wetlands--only that such land would be taxed at a lower rate while kept as wetlands. Total reliance on strengthening the Williamson Act to preserve wetlands is not advisable.

The Service encourages and supports all of the above wetland preservation strategies and believes that for existing tidal marsh they will be adequate. Reliance on any one as "the" strategy is not realistic; reliance on all of them will provide great dividends. The FWS program presented herein will defer to other preservation schemes where feasible. The potential for marsh restoration will depend upon FWS or state acquisition of diked former tidelands.

The scope and magnitude of the present program requires a heavy dependence on Service involvement. In the final analysis, however, the overall strategy depends upon utilization of all preservation techniques described above. A summary of potential funding sources for protection of coastal wetlands California is presented below for reference :

Federal

1. Migratory Bird Hunting and Conservation Stamp Act (Federal sale of duck stamps used primarily for acquisition of waterfowl lands.)

2. Land and Water Conservation Fund (Prior to the passage of the Endangered Species Act of 1973, such funds were only available to the Service for endangered species land acquisition. The 1973 Act provides up to two-thirds federal share of the acquisition cost for state projects.)

3. Pittman-Robertson Wildlife Restoration Act (State's share of Federal Excise Taxes on sale of guns and ammunition.)

4. Special Appropriations by Congress.

State

1. Environmental Protection Program Act (State sale of personalized auto licenses.)

2. Wildlife Conservation Board (WCB) (State's share of parimutual funds and other appropriations to Board, such as Land and Water Conservation Funds for park acquisition).

3. Special legislative appropriations.

4. Wildlife Preservation Fund (State sale of licenses, tags, stamps, etc., for management of state wildlife resources).

5. State Duck Stamp Act of 1970.

6. California Coastal Plan and Management Program acquisition authorizations.

7. State Coastal Conservancy.

Private

1. Land Exchange (Federal and state lands can be used for exchange with private lands or with other federal and state agency lands.)

Miscellaneous

1. Private Funding Sources such as Nature Conservancy, Audubon Society, Conservation Foundation, etc., and from local special interest groups and private donations and gifts.

2. FWS and CDFG lease of state tidelands administered by State Lands Commission.



North San Francisco Bay former marshland



X. Selected Bibliography

X. SELECTED BIBLIOGRAPHY

Anonymous, 1974. Navigable Waters Handbook. U.S. Fish & Wildlife Service.

Anonymous, 1972. Conservation of National Resources. Marine Corps Base, Camp Pendleton, CA.

Bauer, R.D., and J.W. Speth. 1974. Acquisition priorities for the coastal wetlands of California. Joint report CDFG and USFWS.

Bellrose, F.C. 1976. Ducks, Geese and Swans of North America. Stackpole Books, Harrisburg.

Bollman, F.H., P.K. Thelin, and R.T. Forester. 1970. Bimonthly Bird Counts at Selected Observation Points Around San Francisco Bay, February, 1964 to January 1966. California Fish & Game 56(4): 224-239.

Bureau of Sport Fisheries & Wildlife and Bureau of Commercial Fisheries (Now Fish & Wildlife Service and National Marine Fisheries Service.) 1970. National Estuary Study. Dept. of Interior, Washington, D.C.

California Coastal Zone Conservation Commission 1975. California Coastal Plan.

California Resources Agency. 1971. California Protected Waterways Plan (Initial Elements.)

CDFG. 1966. California Fish and Wildlife Plan. Vol. I-IV. Sacramento, CA.

CDFG. 1970. The Natural Resources of Bolinas Lagoon. Coastal Wetland Series #3.

CDFG. 1970. The Natural Resources of Goleta Slough. Coastal Wetland Series #2.

CDFG. 1972. The Natural Resources of Elkhorn Slough. Coastal Wetland Series #4.

CDFG. 1973. Natural Resources of Humboldt Bay. Coastal Wetland Series #6.

CDFG. 1974. The Natural Resources of Morro Bay. Coastal Wetland Series #8.

CDFG. 1974. Natural Resources of the Eel River Delta. Coastal Wetlands Series #9.

CDFG. 1975. Natural Resources of Lake Earl and the Smith River Delta. Coastal Wetland Series #10.

CDFG. 1976. The Natural Resources of Mugu Lagoon. Coastal Wetland Series #17.

CDFG. 1975. Natural Resources of Bodega Harbor. Coastal Wetland Series #11.

CDFG. 1976. The Natural Resources of Carpenteria Marsh. Coastal Wetland Series #13.

CDFG. 1976. The Natural Resources of Northern Santa Barbara County. Coastal Wetland Series #14.

CDFG. 1976. The Natural Resources of the Nipomo Dunes and Wetlands. Coastal Wetland Series #15.

CDFG. 1977. The Natural Resources of the Napa Marsh. Coastal Wetland Series #19.

CDFG. 1977. The Natural Resources of Estero Americano and de San Antonio. Coastal Wetland Series #20.

Chattin, J. Pacific Waterfowl Flyway Reports 1973-1977.

Day, A. 1949. North American Waterfowl. Stackpole, Harrisburg.

Department of the Interior, FWS. Review of Fish and Wildlife Aspects of Proposals in or Affecting Navigable Waters. Adoption of Guidelines. Federal Register Monday, December 1, 1975 Part IV.

Goodwin, R.H., and W.A. Niering. 1975. Inland Wetlands of the U.S. Evaluated as Potential Registered Landmarks. National Park Service. Natural Hist. Theme Studies No. 2.

Kozlik, F.M. 1975. Management and Production - West Coast habitat in First International Waterfowl Symposium. Ducks Unlimited, Chicago.

Kozlik, F.M. 1974. Waterfowl of California. CDFG. Information booklet.

Lyle, J. 1971. The Coastal Lagoons of San Diego County. Laboratory for experimental design, CA. Poly. Pomona.

Marshall, W.F. 1953. Bird Populations in representative habitats of Mission Bay, San Diego County, California, from September 27, 1950 to September 29, 1951. MS Thesis, San Diego State College.

Moss Landing Harbor District. 1976. Biological Assessment of Old Salinas River Channel for proposed Moss Landing Harbor Expansion. Madrone Associates.

Pacific Waterfowl Flyway Council Technical Committee. 1978. Management Plan Pacific Coast Brant.

Ralph, C.J. (ed.) 1965. Annual Report. Point Reyes Bird Observatory, California.

San Francisco Bay Conservation & Development Commission. 1969. San Francisco Bay Plan.

Scott, M. 1963. The Future of San Francisco Bay. Institute of Governmental Studies, University of California, Berkeley.

Shannon, W.T. 1965. Private Clubs and the Waterfowl Resource. Trans. 30th North American Wildlife & Natural Resources Conference, pp. 255-259.

U.S. Department of Commerce, National Oceanic & Atmosphere Administration, Office of Coastal Zone Management. 1977. State of California Coastal Management Program and Final EIS.



Old Salinas River Habitat



XI. Appendices

APPENDIX A

PROPOSED U.S. FISH AND WILDLIFE SERVICE

MIGRATORY BIRD LAND ACQUISITION PROGRAM

NATIONAL PRIORITY CATEGORIES, FY 1977-1986

APPENDIX A. PROPOSED U.S. FISH AND WILDLIFE SERVICE
MIGRATORY BIRD LAND ACQUISITION PROGRAM
NATIONAL PRIORITY CATEGORIES, FY 1977-86

Priority	Flyway[1]	Geographic Location	Habitat Type[2]
1	C	Prairie Pothole (ND, SD, MT)	B
2	C	Western Prairie Pothole (ND, SD, NE, MT)	B
3	M	Eastern Prairie Pothole (MN)	B
4	P	California Central Valley	W
5	A	Mid-Atlantic Coast (NC to MA)	W
6	P	Coastal California	W
7	M	Mississippi Delta, Hardwoods (AR, MS, LA)	W
8	C	Coastal Texas	W
9	M	Central Gulf Coast (Primarily LA)	W
10	P	Great Basin (ID, UT, NV)	B
11	M	Outside Prairie Pothole (WI, MI, MN)	B
12	A	Atlantic Coast, Eastern Gulf (Ches. Bay, Del. Bay, GA, NC, SC, FL)	W
13	C	Outside Prairie Pothole (NE, CO, MT, WY)	B
14	P	Coastal Washington	W
15	P	Coastal Oregon	W
16	A	Inland (Primarily NC, SC, GA)	W
17	P	Inland (Primarily CA, WA, OR, ID)	B
18	A	Inland New England	B
19	M	Inland	W
20	P	Inland	W
21	P	Great Basin	B
22	A	Inland (Mostly VA)	W
23	C	Inland (TX, CO, NM, OK, KA)	W
24	P	Coastal (OR, WA)	M
25	A	Coastal (NJ to ME)	M
26	M	Inland	B
27	C	Inland	B
28	C	Coastal	M
29	P	Inland	M
30	M	Inland (Upper Mississippi & Illinois Rivers)	M
31	A	Inland	M
32	C	Inland	M
33	All		R

[1]Flyway Symbols:
P - Pacific
C - Central
M - Mississippi
A - Atlantic

[2]Habitat Type:
B - Breeding
M - Migration
W - Wintering
R - Recreation

APPENDIX B

DISTRIBUTION AND MIGRATION MAPS AND POPULATION DATA

We gratefully acknowledge the cooperation of Stackpole Books, Harrisburg, PA and Frank Bellrose, Jr. in granting permission to reproduce the migration maps from "Ducks, Geese, and Swans of North America", Bellrose, 1976.

MID-WINTER INVENTORY: GREAT BASIN CANADA GOOSE

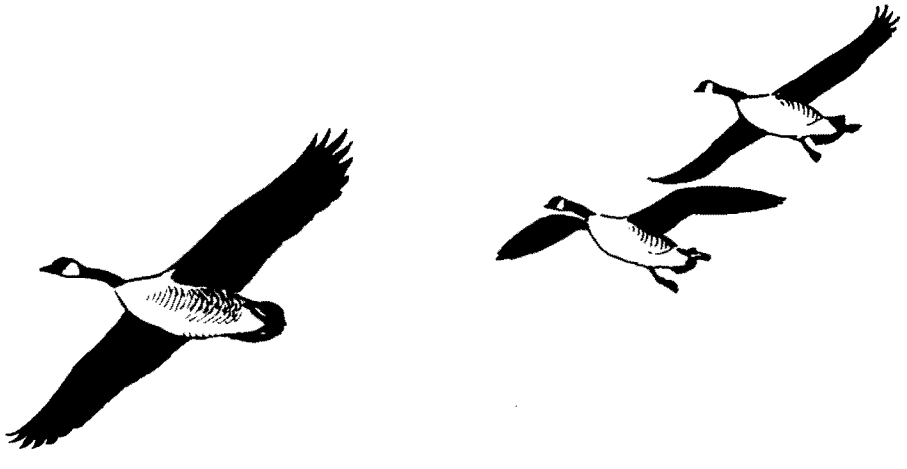
	Pacific Flyway	Coast[+++] Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	143,319	70 (Tr)[+]	35 (50)[++]	25 (36)[++]	10 (14)[++]
1976	218,239	50 (Tr)	50 (100)	0	0
1975	133,550	75 (Tr)	0	75 (100)	---
1974	111,383	0	0	0	---
1973	112,000	80 (Tr)	0	80 (100)	---

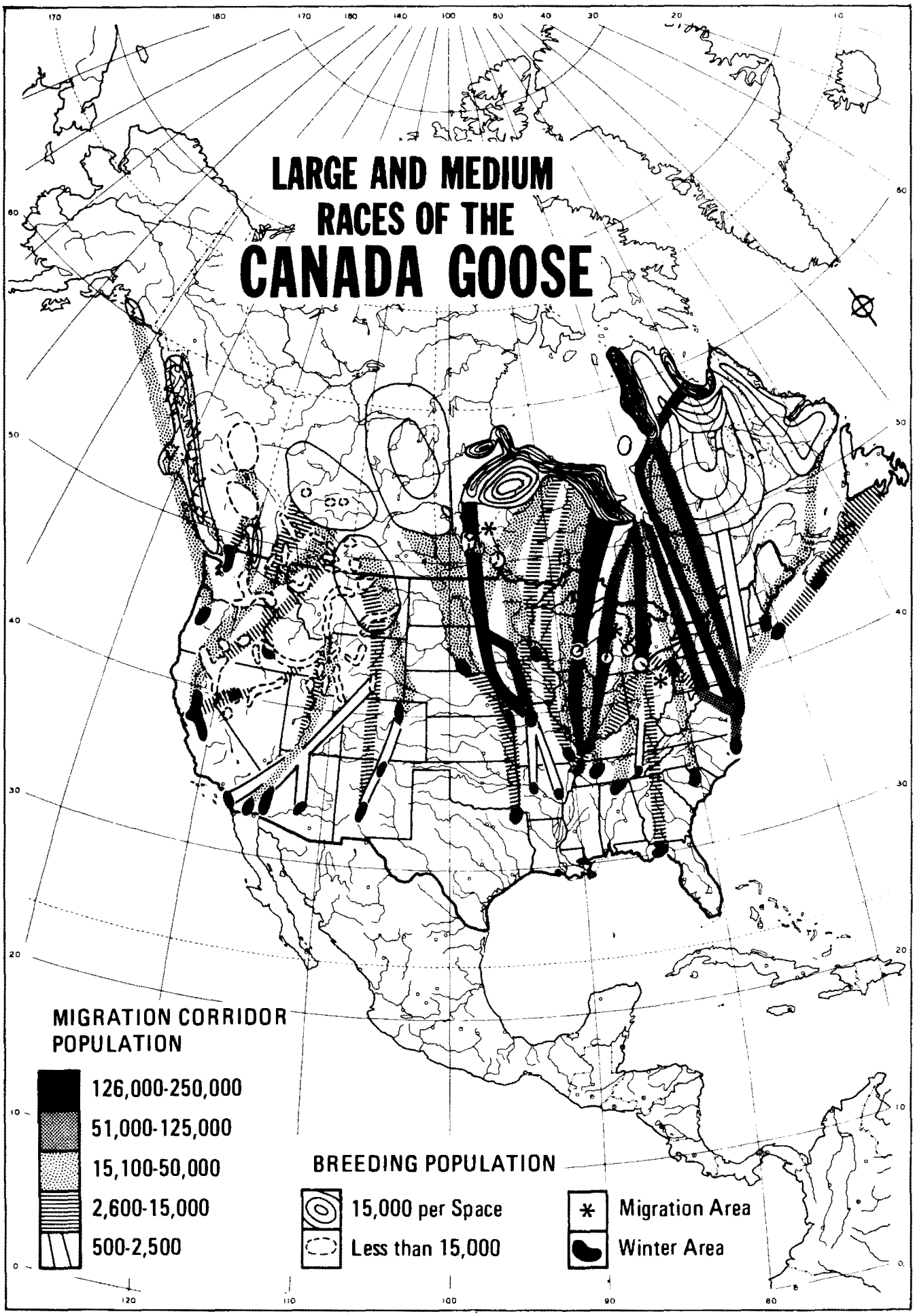
State Population 1973-1977 Average: 38,380

Flyway population 1954-1976 Average 84,311

Continental Population 1973-1977 Average: 84,311

\+ - % of Pacific Flyway
++ - % of Coast
+++ - Note: Most Canada geese using wetlands within the coastal zone occur in the Weyland Lake area near Camp Pendleton in San Diego County. About 5,000 geese use this area in the winter.




LARGE AND MEDIUM
RACES OF THE
CANADA GOOSE
MIGRATION CORRIDOR
POPULATION
126,000-250,000
51,000-125,000
15,100-50,000
2,600-15,000
500-2,500
BREEDING POPULATION
15,000 per Space
Less than 15,000
Migration Area
Winter Area

MID-WINTER INVENTORY: PACIFIC BRANT

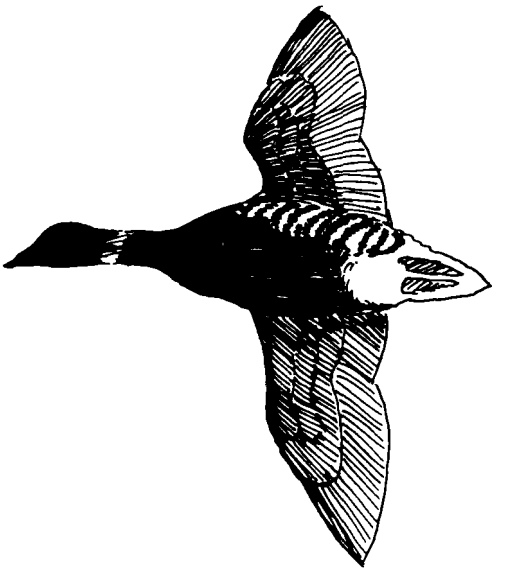
Year	Pacific Flyway	California Population	Humboldt Bay	Morro-San Diego Bays	Marin-Sonoma Coastal Bays
1977	146,967	0 (0)+	0 (0)++	0 (0)++	0 (0)++
1976	122,045	680 (Tr)	15 (2)	515 (76)	150 (22)
1975	123,490	480 (Tr)	0 (0)	400 (83)	80 (17)
1974	129,671	470 (Tr)	0 (0)	0 (0)	470 (100)
1973	125,005	950 (Tr)	0 (0)	910 (96)	40 (4)

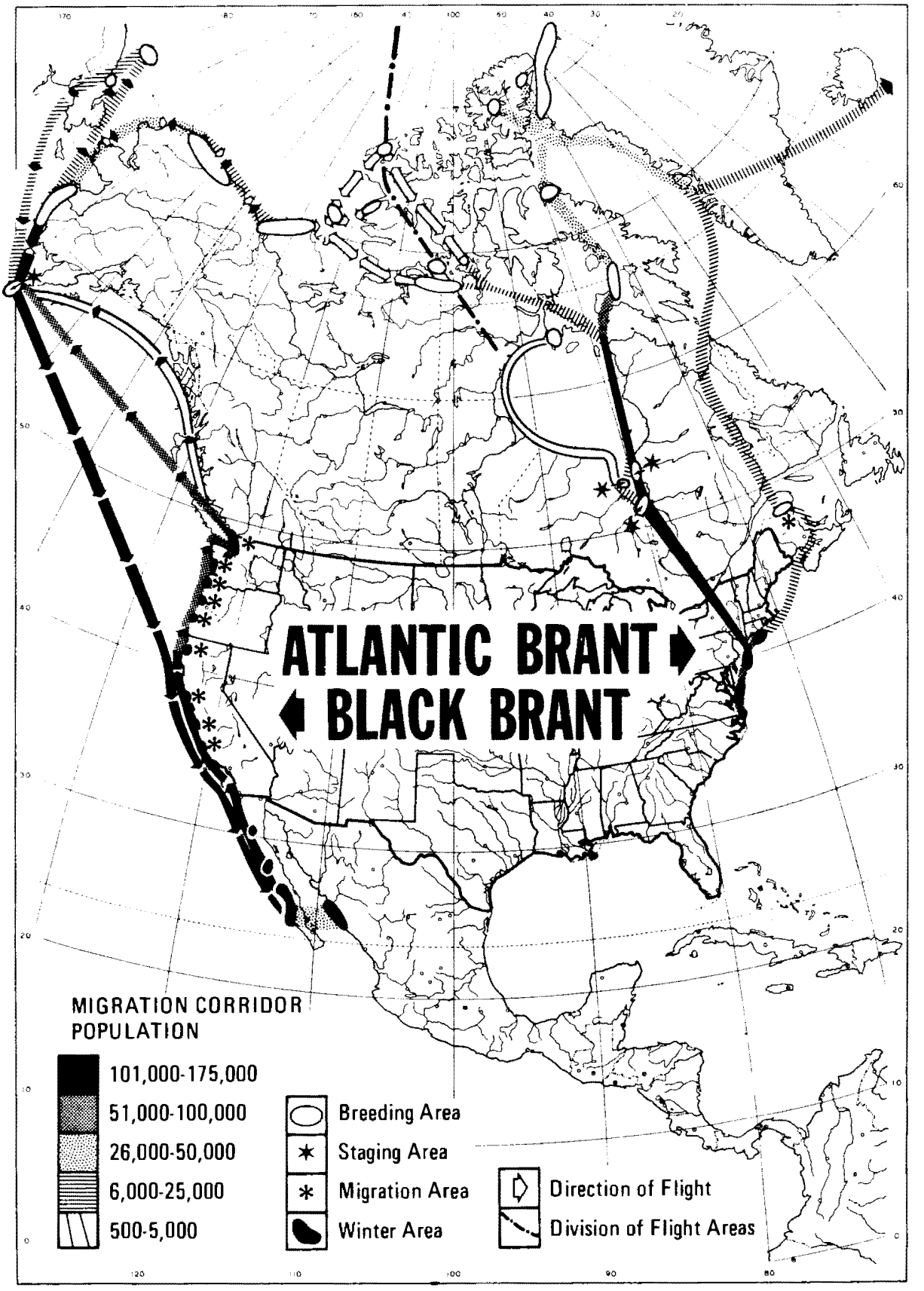
State Population 1973-1977 Average: 516

Flyway Population 1954-1977 Average: 140,000

Continental Population 1973-1977 Average: 129,000 Pacific Brant and 83,700 Atlantic Brant

\+ - % of Pacific Flyway
++ - % of Coast




ATLANTIC BRANT
BLACK BRANT
MIGRATION CORRIDOR POPULATION
101,000-175,000
51,000-100,000
26,000-50,000
6,000-25,000
500-5,000
Breeding Area
Staging Area
Migration Area
Winter Area
Direction of Flight
Division of Flight Areas

MID-WINTER INVENTORY: AMERICAN WIGEON

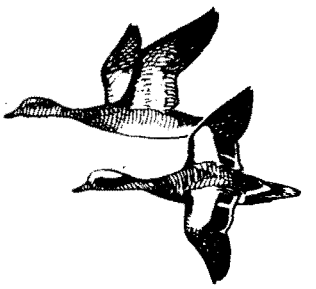
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	713,519	39,860 (6)+	24,425 (61)++	11,065 (28)++	4,370 (11)++
1976	850,315	24,870 (3)	19,945 (80)	2,960 (12)	1,965 (8)
1975	767,318	27,571 (4)	5,625 (20)	21,946 (80)	---
1974	890,135	37,162 (4)	25,092 (68)	12,070 (32)	---
1973	817,531	18,535 (2)	12,182 (66)	6,353 (34)	---

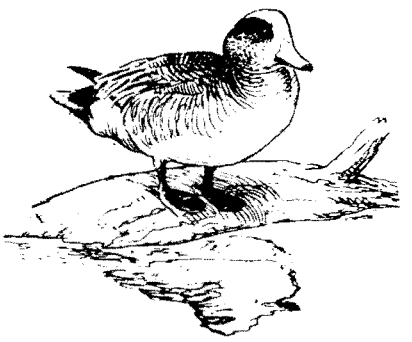
State Population 1973-1977 Average: 547,280

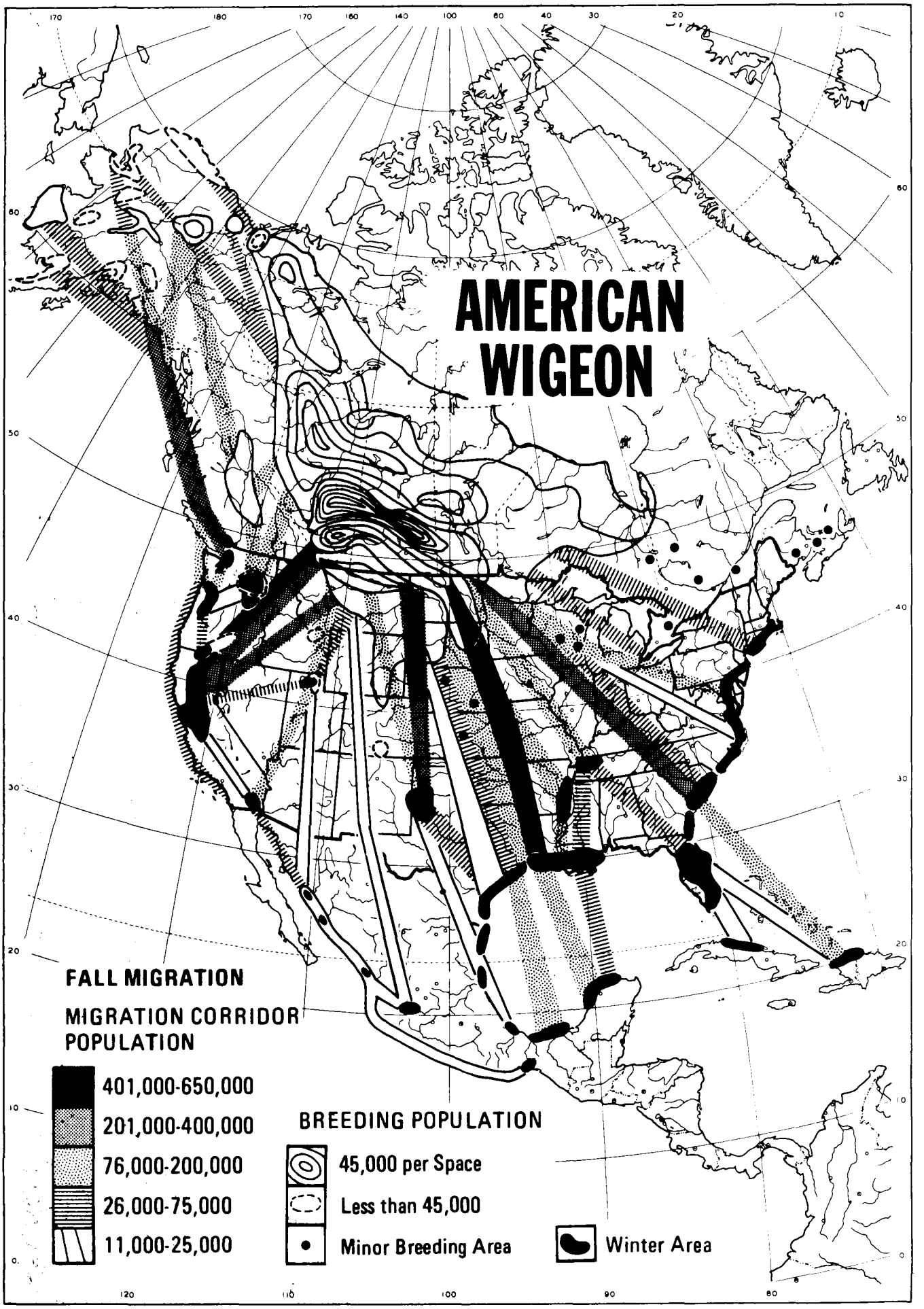
Flyway Population 1954-1976 Average: 940,269

Continental Population 1973-1977 Average: 1,466,904

\+ - % of Pacific Flyway
++ - % of Coast






AMERICAN WIGEON
FALL MIGRATION
MIGRATION CORRIDOR POPULATION
401,000-650,000
201,000-400,000
76,000-200,000
26,000-75,000
11,000-25,000
BREEDING POPULATION
45,000 per Space
Less than 45,000
Minor Breeding Area
Winter Area

MID-WINTER INVENTORY: GREEN-WINGED TEAL

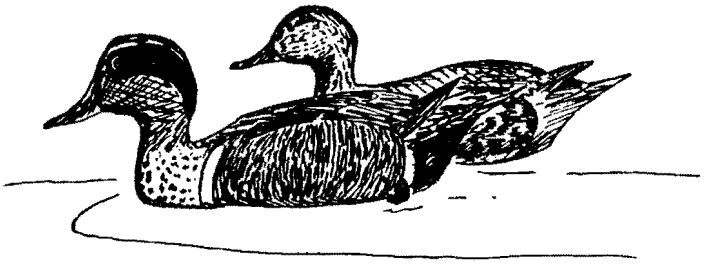
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	367,834	2,920 (1)+	1,550 (53)++	1,340 (46)++	30 (1)++
1976	397,691	3,115 (1)	2,570 (83)	70 (2)	475 (15)
1975	406,695	361 (Tr)	15 (4)	346 (96)	---
1974	281,133	575 (Tr)	0 (0)	575 (100)	---
1973	228,109	2,238 (1)	0 (0)	2,238 (100)	---

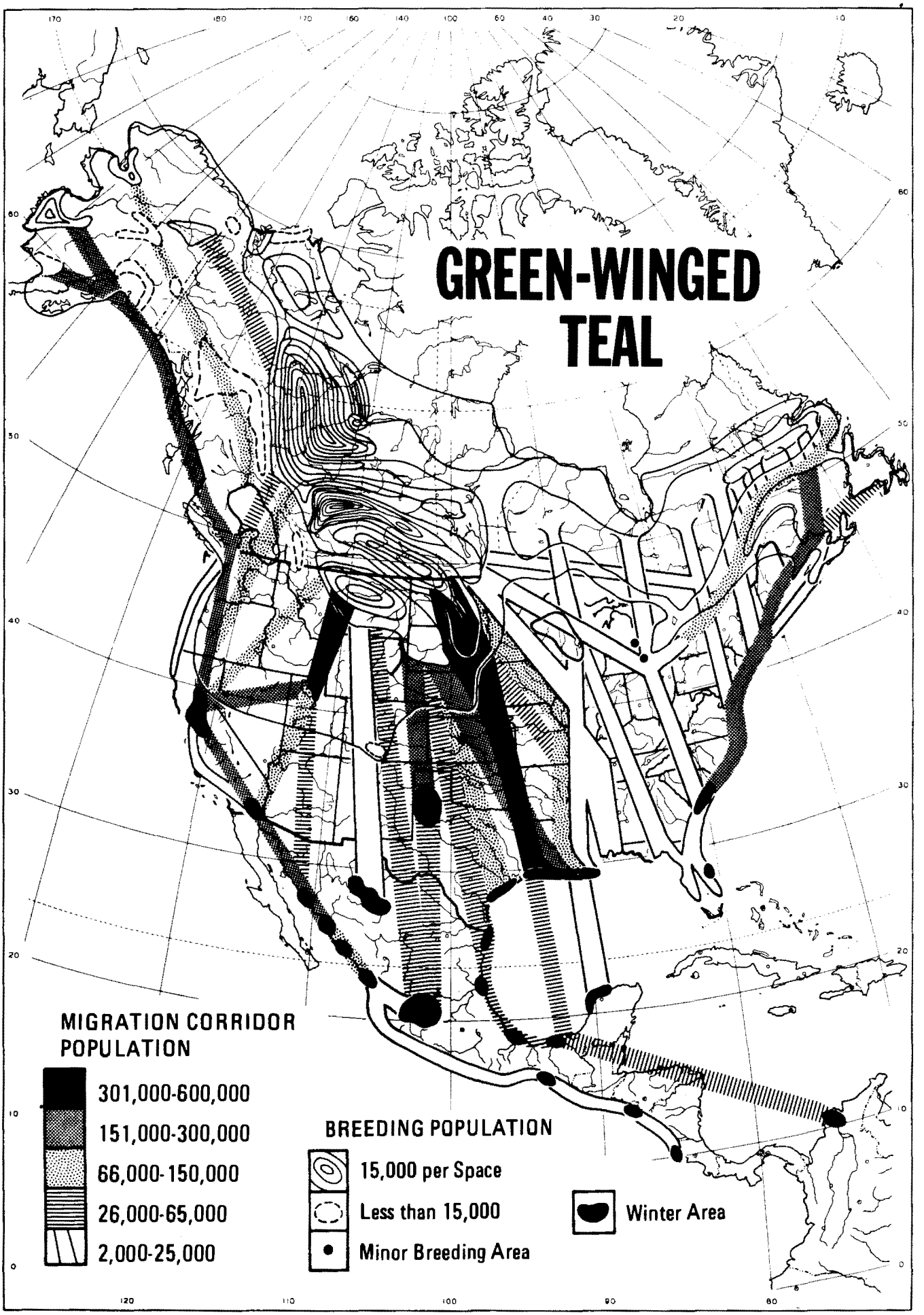
State Population 1973-1977 Average: 158,826

Flyway Population 1954-1976 Average: 340,978

Continental Population 1973-1977 Average: 1,824,830

\+ - % of Pacific Flyway
++ - % of Coast




GREEN-WINGED TEAL
MIGRATION CORRIDOR POPULATION
301,000-600,000
151,000-300,000
66,000-150,000
26,000-65,000
2,000-25,000
BREEDING POPULATION
15,000 per Space
Less than 15,000
Minor Breeding Area
Winter Area

MID-WINTER INVENTORY: PINTAIL

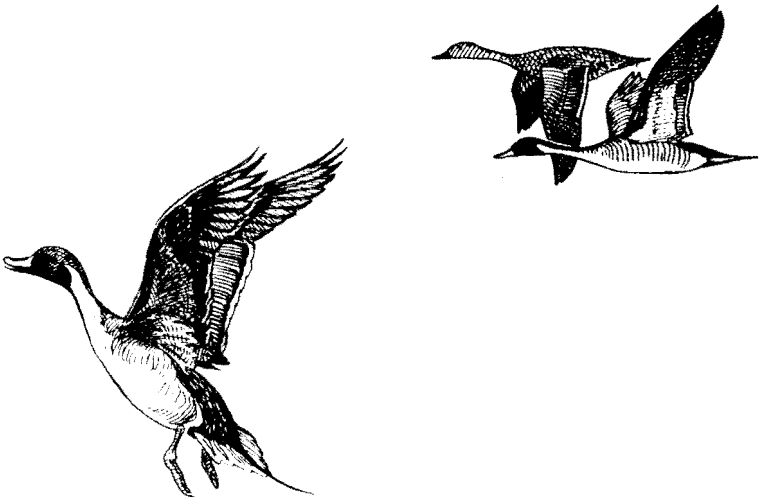
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	4,163,783	52,740 (Tr)[+]	14,750 (30)[++]	36,590 (69)[++]	1,400 (1)[++]
1976	4,013,611	19,180 (Tr)	9,020 (47)	7,610 (40)	2,550 (13)
1975	4,325,704	30,574 (Tr)	2,144 (7)	28,430 (93)	---
1974	3,655,666	25,307 (Tr)	8,017 (32)	17,290 (68)	---
1973	3,592,792	10,654 (Tr)	1,067 (10)	9,587 (90)	---

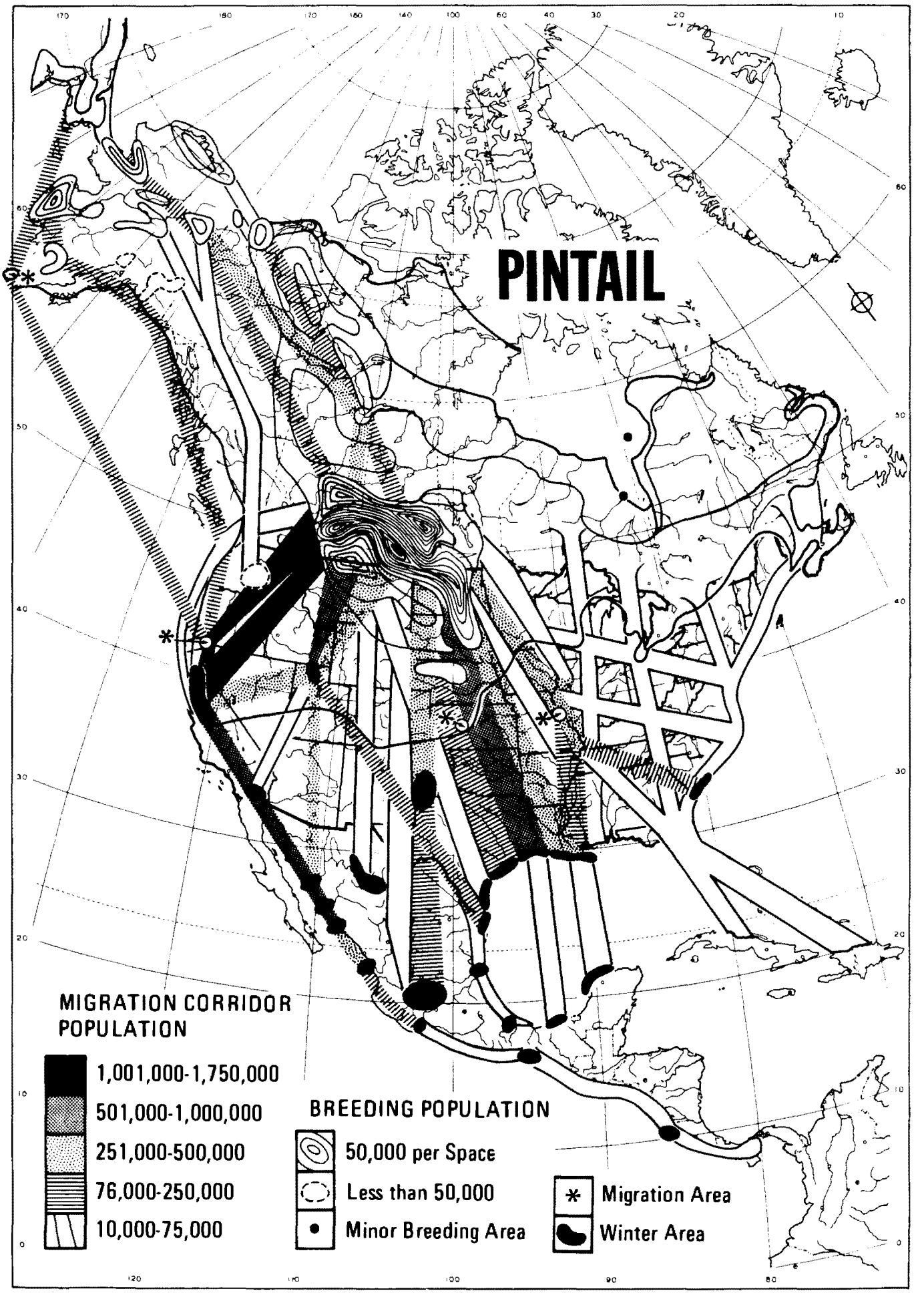
State Population 1973-1977 Average: 3,157,192

Flyway Population 1954-1976 Average: 2,848,196

Continental Population 1973-1977 Average: 5,789,503

\+ - % of Pacific Flyway
++ - % of Coast




PINTAIL
MIGRATION CORRIDOR POPULATION
1,001,000-1,750,000
501,000-1,000,000
251,000-500,000
76,000-250,000
10,000-75,000
BREEDING POPULATION
50,000 per Space
Less than 50,000
Minor Breeding Area
Migration Area
Winter Area

MID-WINTER INVENTORY: SHOVELER

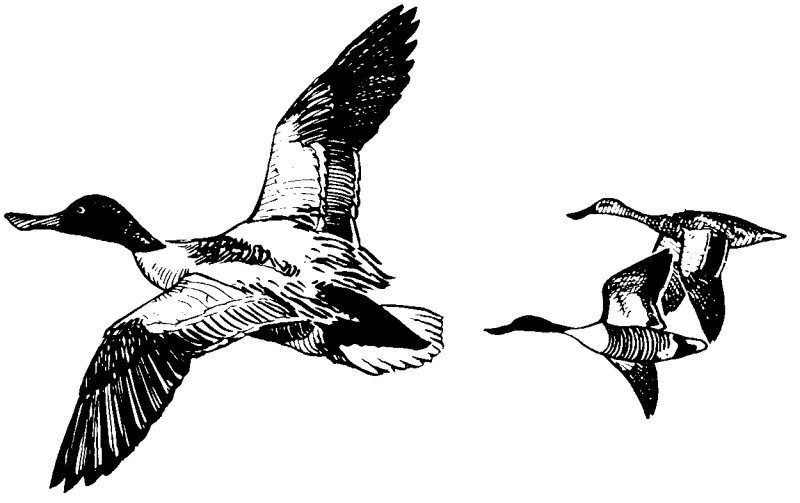
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	847,374	19,180 (2)+	1005 (5)++	18,155 (95)++	20 (Tr)++
1976	681,868	7,935 (1)	65 (1)	7,760 (98)	110 (1)
1975	823,982	8,526 (1)	47 (1)	8,479 (99)	---
1974	509,794	10,155 (2)	0 (0)	10,155 (100)	---
1973	695,967	33,657 (5)	35 (Tr)	32,622 (100)	---

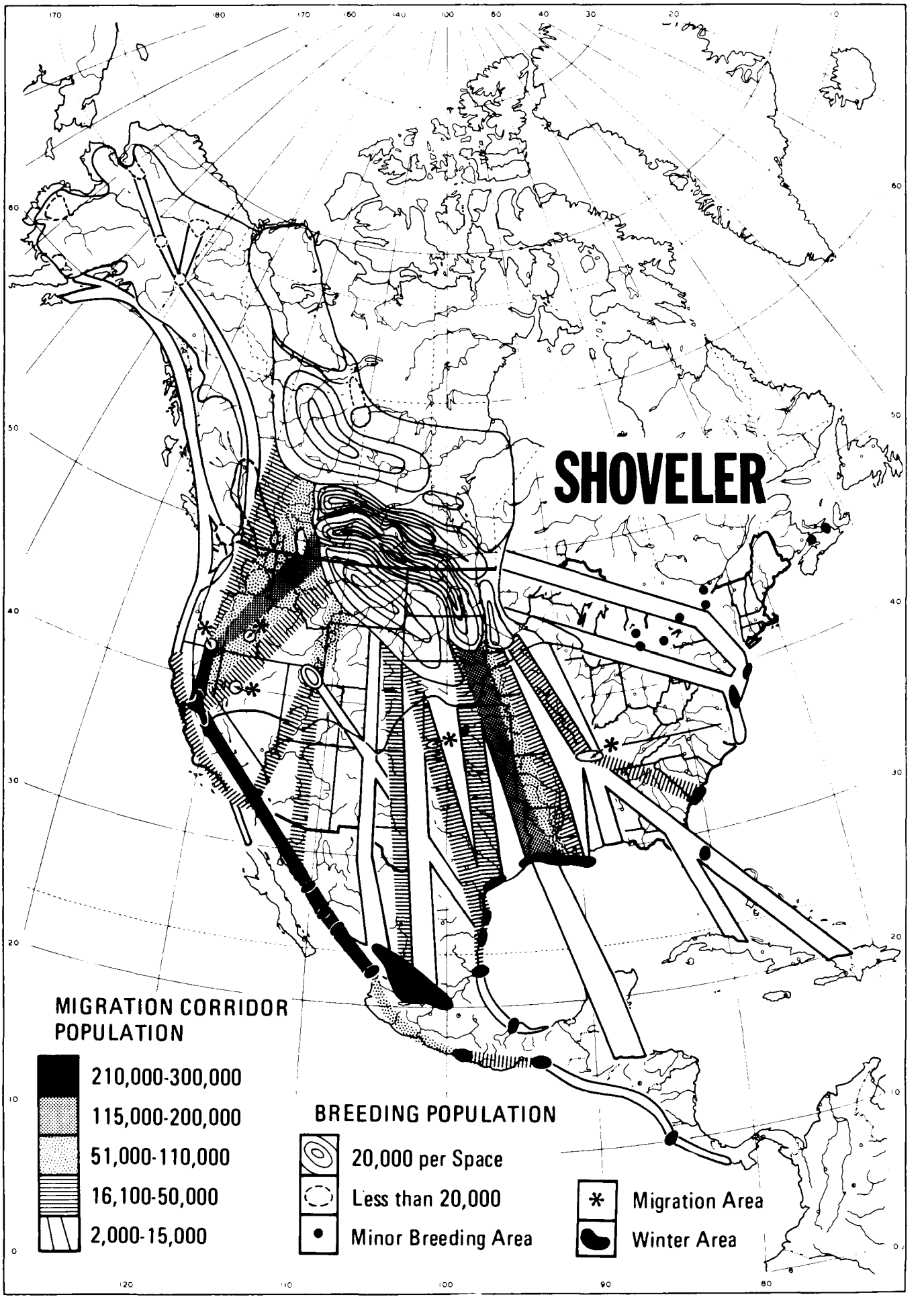
State Population 1973-1977 Average: 617,125

Flyway Population 1954-1976 Average: 381,167

Continental Population 1973-1977 Average: 996,915

\+ - % of Pacific Flyway
++ - % of Coast




SHOVELER
MIGRATION CORRIDOR POPULATION
210,000-300,000
115,000-200,000
51,000-110,000
16,100-50,000
2,000-15,000
BREEDING POPULATION
20,000 per Space
Less than 20,000
Minor Breeding Area
Migration Area
Winter Area

MID-WINTER INVENTORY: CANVASBACK

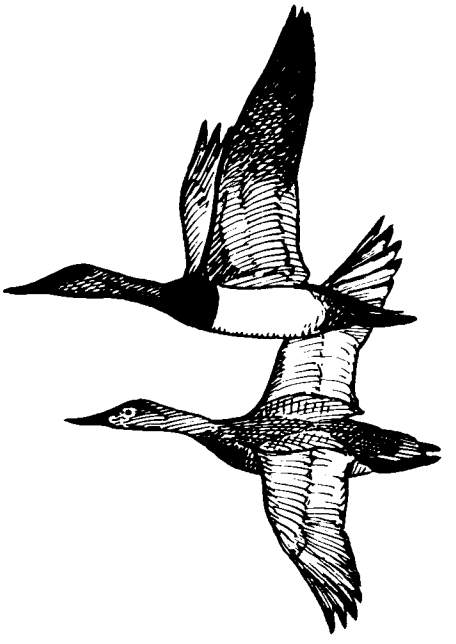
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	90,420	25,100 (28)	1,810 (7)	22,160 (88)	1,130 (5)
1976	83,711	27,680 (33)	1,315 (5)	26,025 (94)	340 (1)
1975	78,933	20,367 (26)	1,282 (6)	19,086 (94)	---
1974	83,360	13,252 (16)	5,217 (39)	8,035 (61)	---
1973	54,719	34,452 (63)	3,137 (9)	31,315 (91)	---

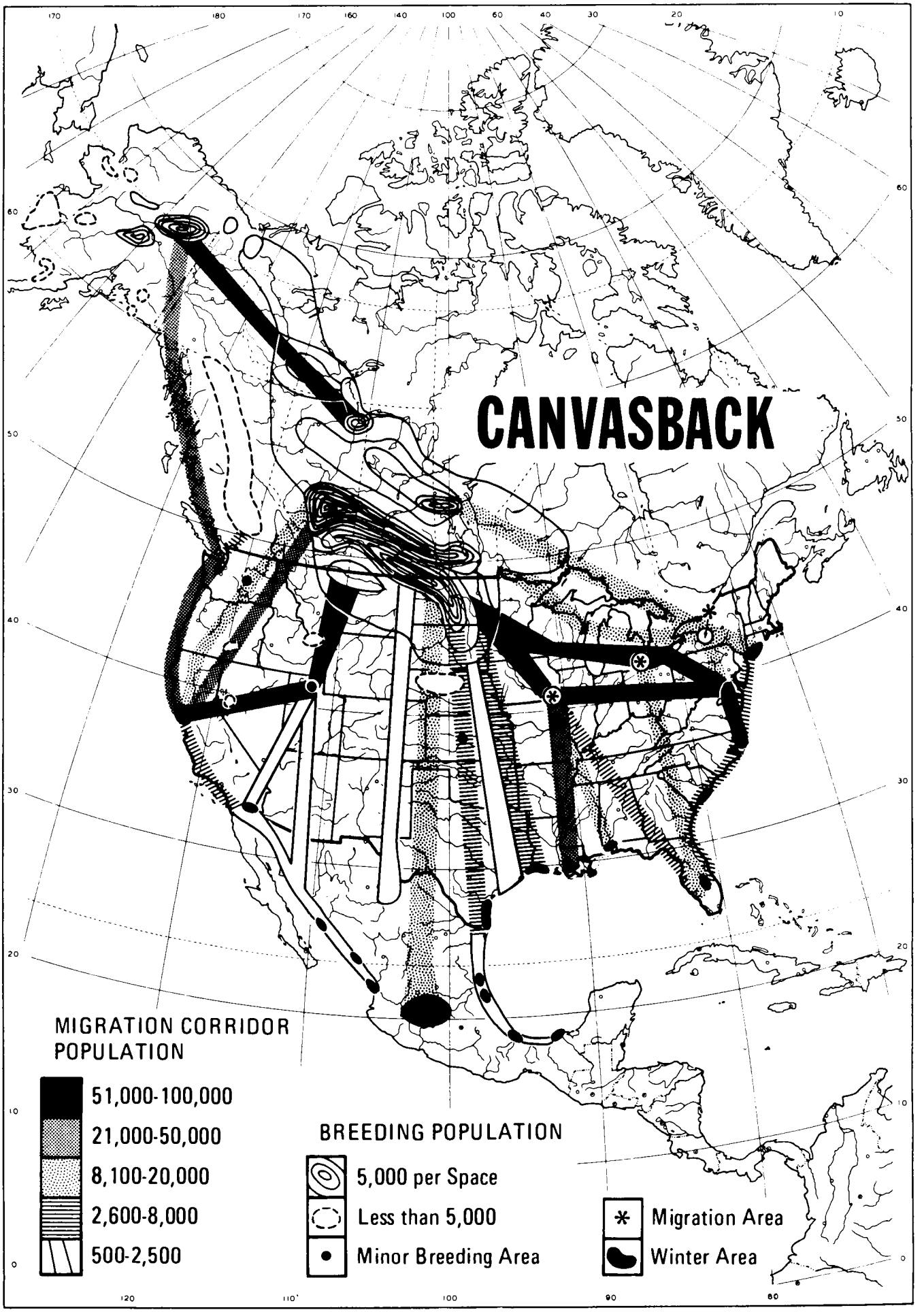
State Population 1973-1977 Average: 60,550

Flyway Population 1954-1976 Average: 74,094

Continental Population 1973-1977 Average: 217,650

\+ - % of Pacific Flyway
++ - % of Coast




CANVASBACK
MIGRATION CORRIDOR POPULATION
51,000-100,000
21,000-50,000
8,100-20,000
2,600-8,000
500-2,500
BREEDING POPULATION
5,000 per Space
Less than 5,000
Minor Breeding Area
Migration Area
Winter Area

MID-WINTER INVENTORY: GREATER SCAUP

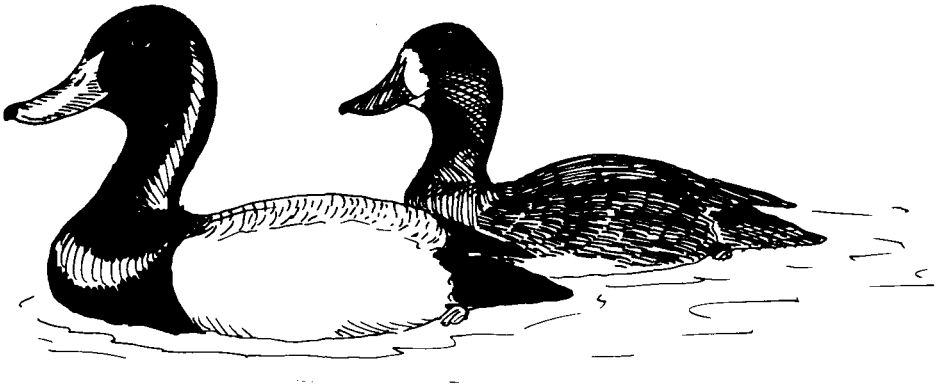
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	84,552	19,466 (87)+	1,420 (7)++	15,460 (78)++	2,900 (15)++
1976	81,173	25,812 (99)	1,132 (4)	24,114 (93)	566 (3)
1975	88,846	13,192 (99)	888 (7)	12,304 (93)	---
1974	33,414	10,499 (87)	1,781 (17)	8,718 (83)	---
1973	56,281	35,618 (96)	1,347 (4)	34,270 (96)	

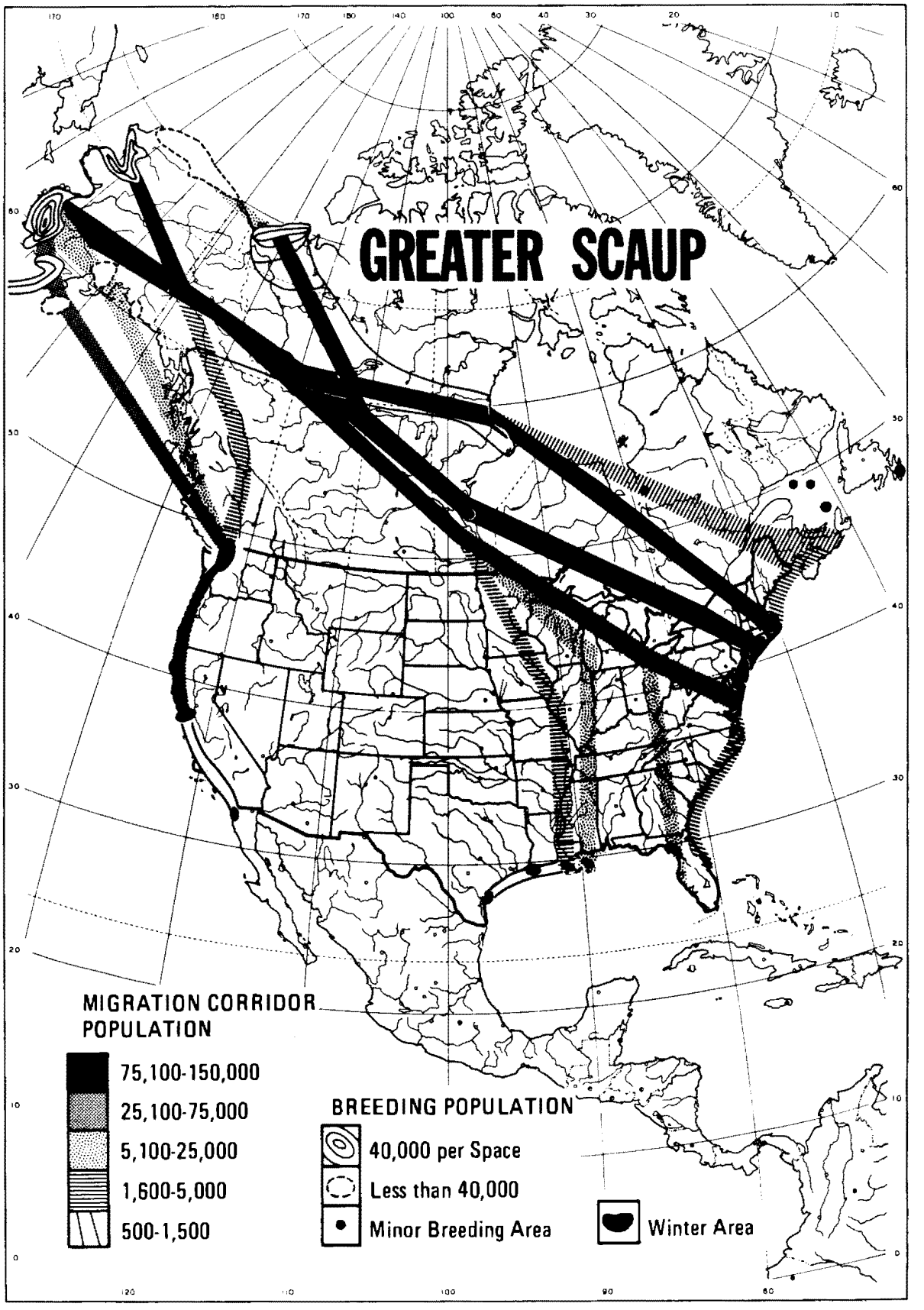
State Population 1973-1977 Average: 22,914

Flyway Population 1954-1976 Average: 65,544

Continental Population 1973-1977 Average: 365,277

\+ - % of Pacific Flyway
++ - % of Coast




GREATER SCAUP
MIGRATION CORRIDOR POPULATION
75,100-150,000
25,100-75,000
5,100-25,000
1,600-5,000
500-1,500
BREEDING POPULATION
40,000 per Space
Less than 40,000
Minor Breeding Area
Winter Area

MID-WINTER INVENTORY: LESSER SCAUP

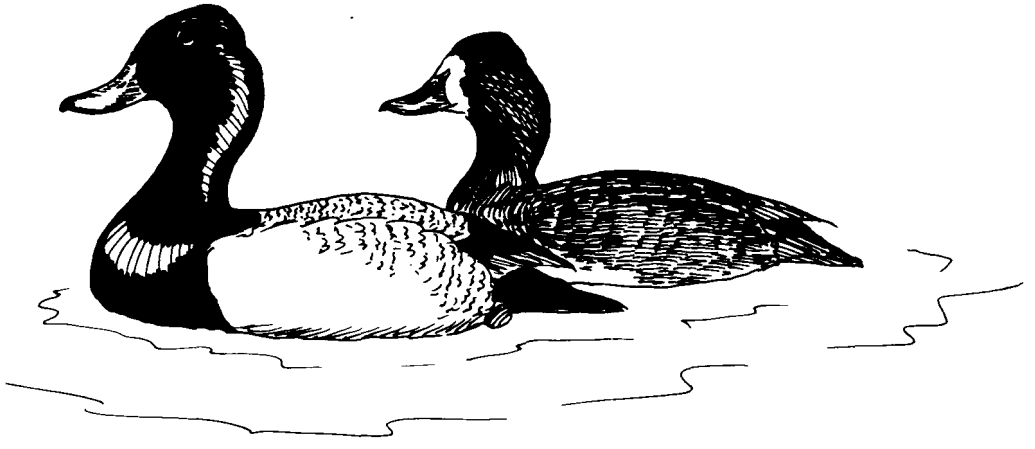
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	137,954	29,199 (21)+	2,130 (7)++	22,405 (77)++	4,350 (16)++
1976	132,439	38,718 (29)	1,698 (4)	36,171 (93)	849 (3)
1975	144,959	19,789 (14)	1,333 (7)	18,456 (93)	---
1974	54,517	15,748 (28)	2,671 (17)	13,077 (83)	---
1973	91,828	53,426 (58)	2,021 (4)	51,406 (96)	---

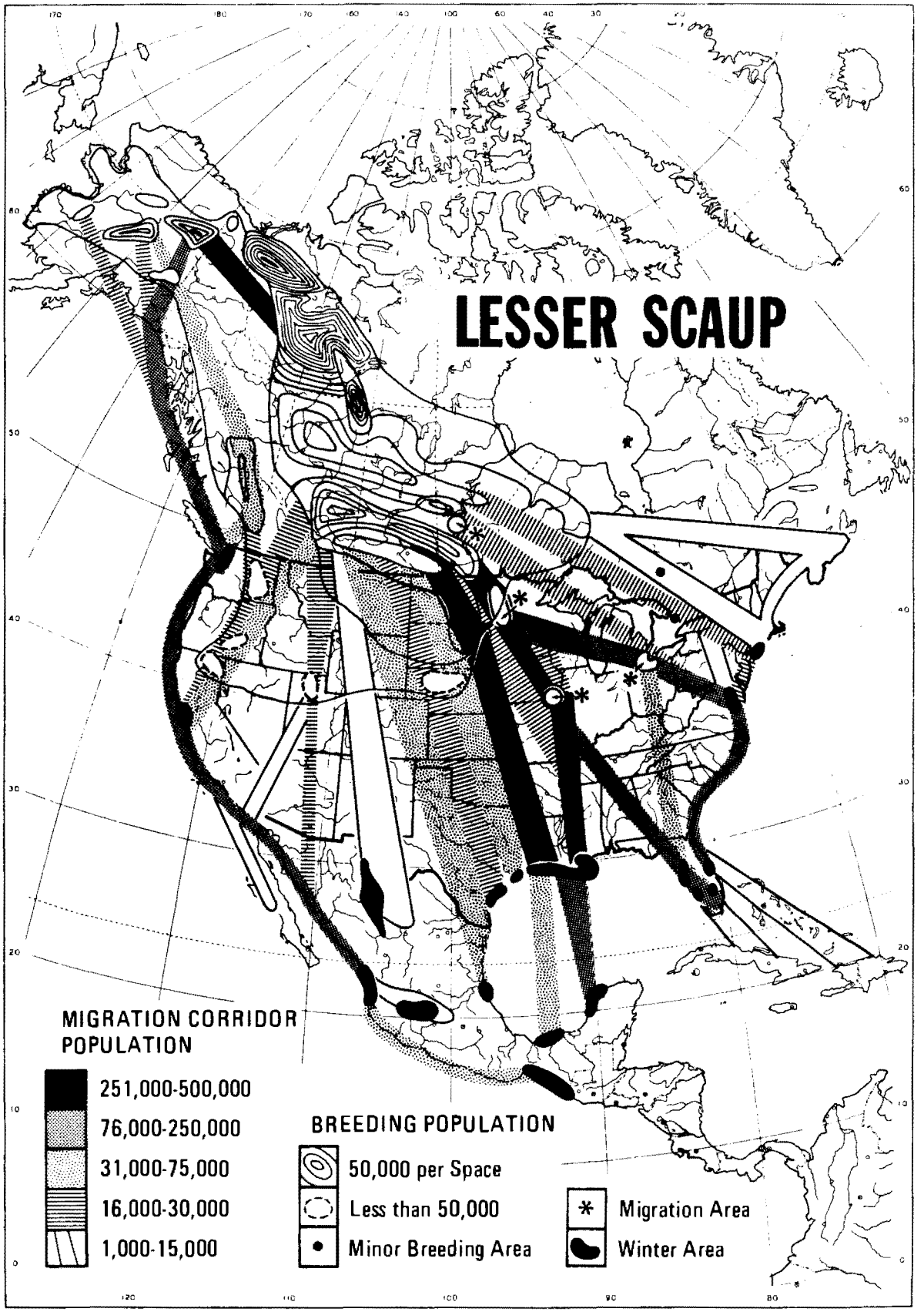
State Population 1973-1977 Average: 34,370

Flyway Population 1954-1976 Average: 98,307

Continental Population 1973-1977 Average: 1,013,788

\+ - % of Pacific Flyway
++ - % of Coast




LESSER SCAUP
MIGRATION CORRIDOR POPULATION
251,000-500,000
76,000-250,000
31,000-75,000
16,000-30,000
1,000-15,000
BREEDING POPULATION
50,000 per Space
Less than 50,000
Minor Breeding Area
Migration Area
Winter Area

MID-WINTER INVENTORY: RED-BREASTED MERGANSER

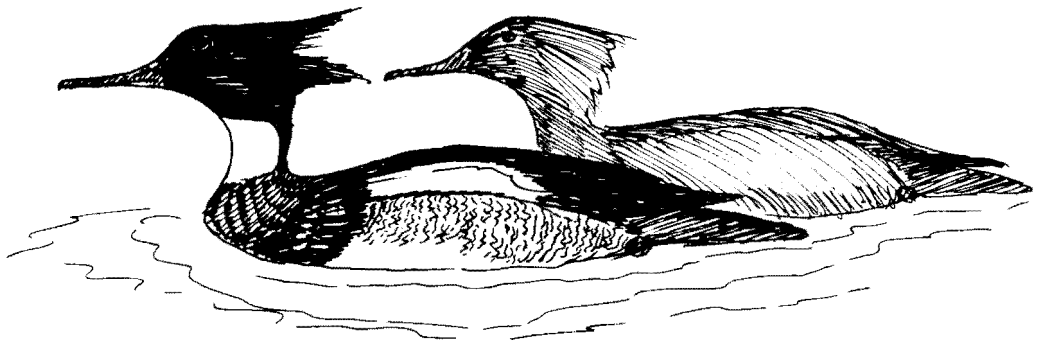
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	11,446	40 (Tr)+	34 (82)++	3 (8)++	4 (10)++
1976	10,570	30 (Tr)	18 (60)	10 (33)	2 (7)
1975	6,786	88 (1)	31 (35)	57 (65)	---
1974	5,917	320 (5)	5 (2)	315 (98)	---
1973	6,570	29 (Tr)	0 (0)	29 (100)	---

State Population 1973-1977 Average: 100

Flyway Population 1954-1976 Average: 6,550

Continental Population 1973- 977 Average: 44,165

\+ - % of Pacific Flyway
++ - % of Coast




RED-BREASTED
MERGANSER
Breeding Area
Winter Area
Minor Breeding Area

MID-WINTER INVENTORY: COMMON GOLDENEYE

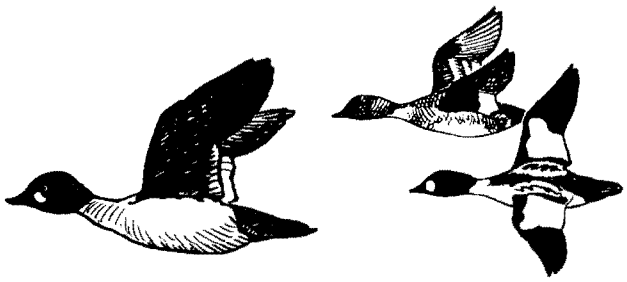
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	49,107	290	5	15	270
1976	41,902	190	5	100	85
1975	36,133	850	0	850	---
1974	37,832	40	0	40	---
1973	42,996	136	0	136	---

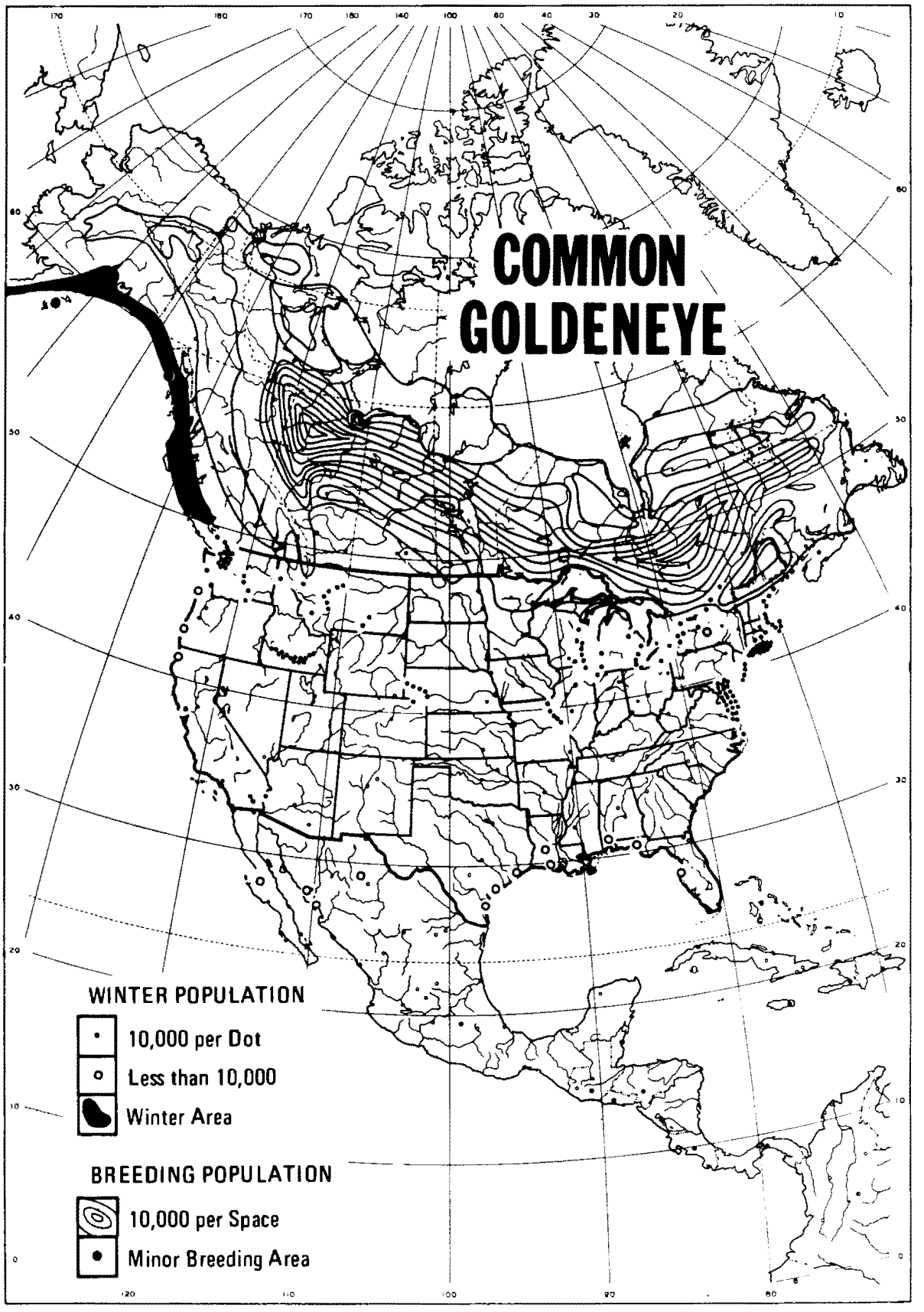
State Population 1973-1977 Average: 1,413

Flyway Population 1954-1976 Average: 46,669

Continental Population 1973-1977 Average: 130,000

\+ - % of Pacific Flyway
++ - % of Coast




COMMON
GOLDENEYE
WINTER POPULATION
10,000 per Dot
Less than 10,000
Winter Area
BREEDING POPULATION
10,000 per Space
Minor Breeding Area

MID-WINTER INVENTORY: BUFFLEHEAD

	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	48,954	7,910 (16)+	2,625 (33)++	1,195 (15)++	4,090 (52)++
1976	29,538	3,295 (11)	1,360 (41)	490 (15)	1,445 (44)
1975	32,855	6,816 (21)	844 (12)	5,972 (88)	---
1974	25,022	2,250 (9)	2,140 (95)	110 (5)	---
1973	39,891	2,458 (6)	205 (8)	2,253 (92)	---

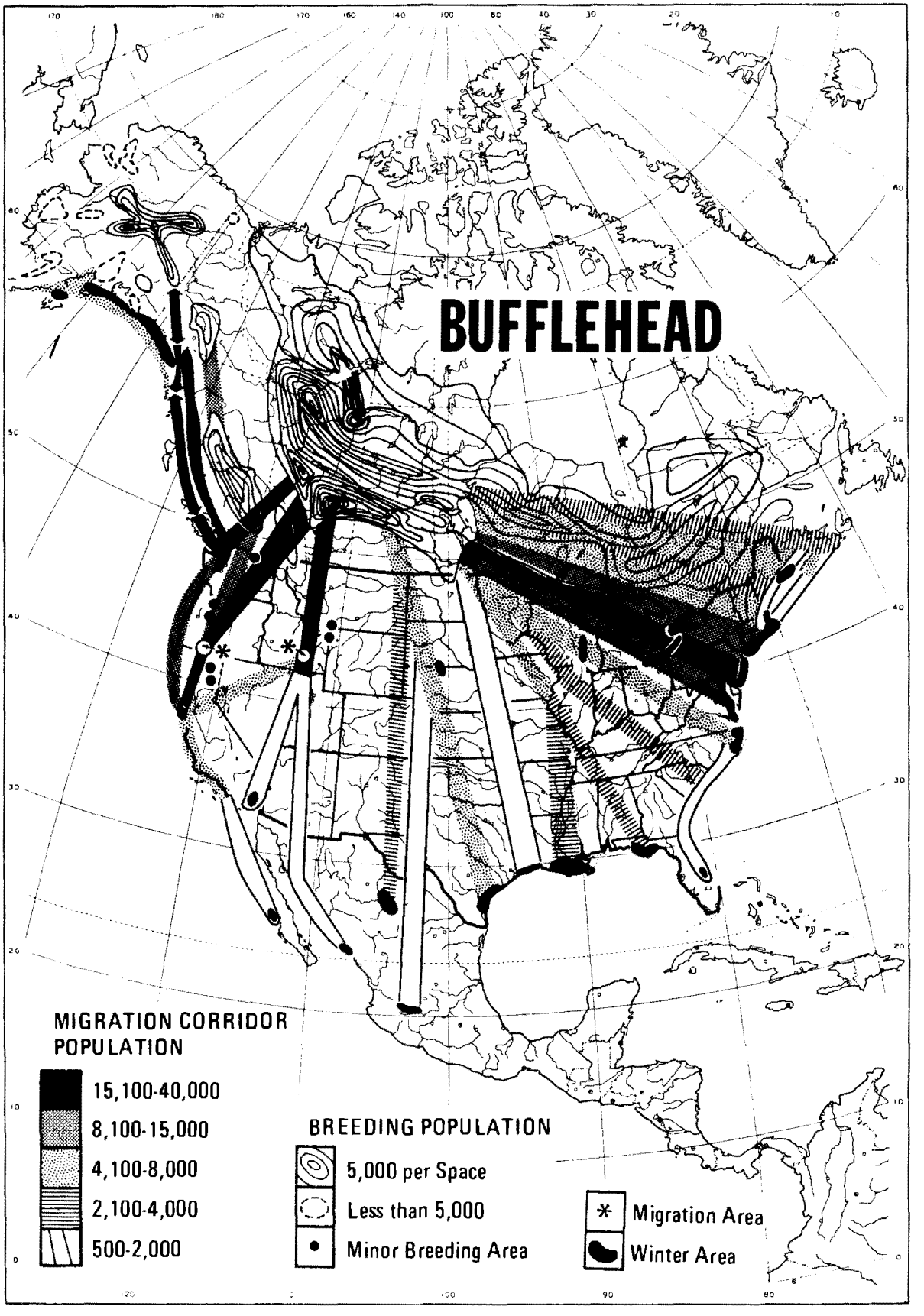
State Population 1973-1977 Average: 5,715

Flyway Population 1954-1976 Average: 28,295

Continental Population 1973-1977 Average: 94,440

\+ - % of Pacific Flyway
++ - % of Coast




BUFFLEHEAD
MIGRATION CORRIDOR POPULATION
15,100-40,000
8,100-15,000
4,100-8,000
2,100-4,000
500-2,000
BREEDING POPULATION
5,000 per Space
Less than 5,000
Minor Breeding Area
Migration Area
Winter Area

MID-WINTER INVENTORY: SURF SCOTER

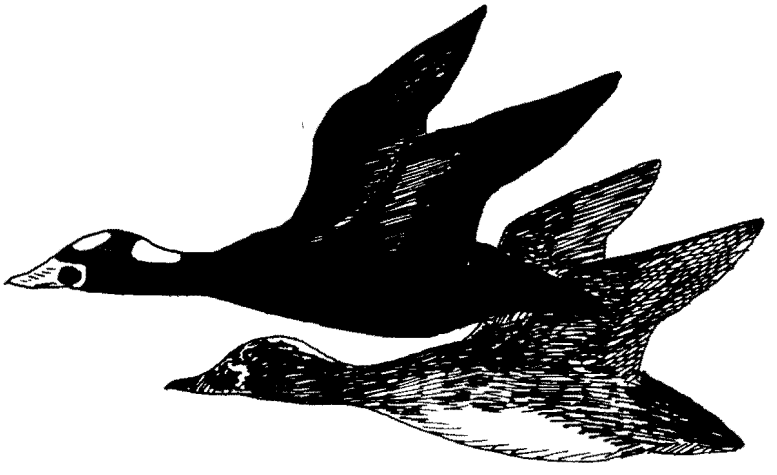
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	86,756	15,163 (17)+	6,096 (40)++	4,992 (33)++	4,074 (27)++
1976	73,910	28,335 (38)	11,061 (39)	13,180 (46)	4,095 (15)
1975	60,594	22,857 (38)	4,348 (23)	17,509 (77)	---
1974	38,102	8,802 (23)	943 (11)	7,860 (89)	---
1973	79,500	23,232 (29)	44,037 (17)	19,195 (83)	---

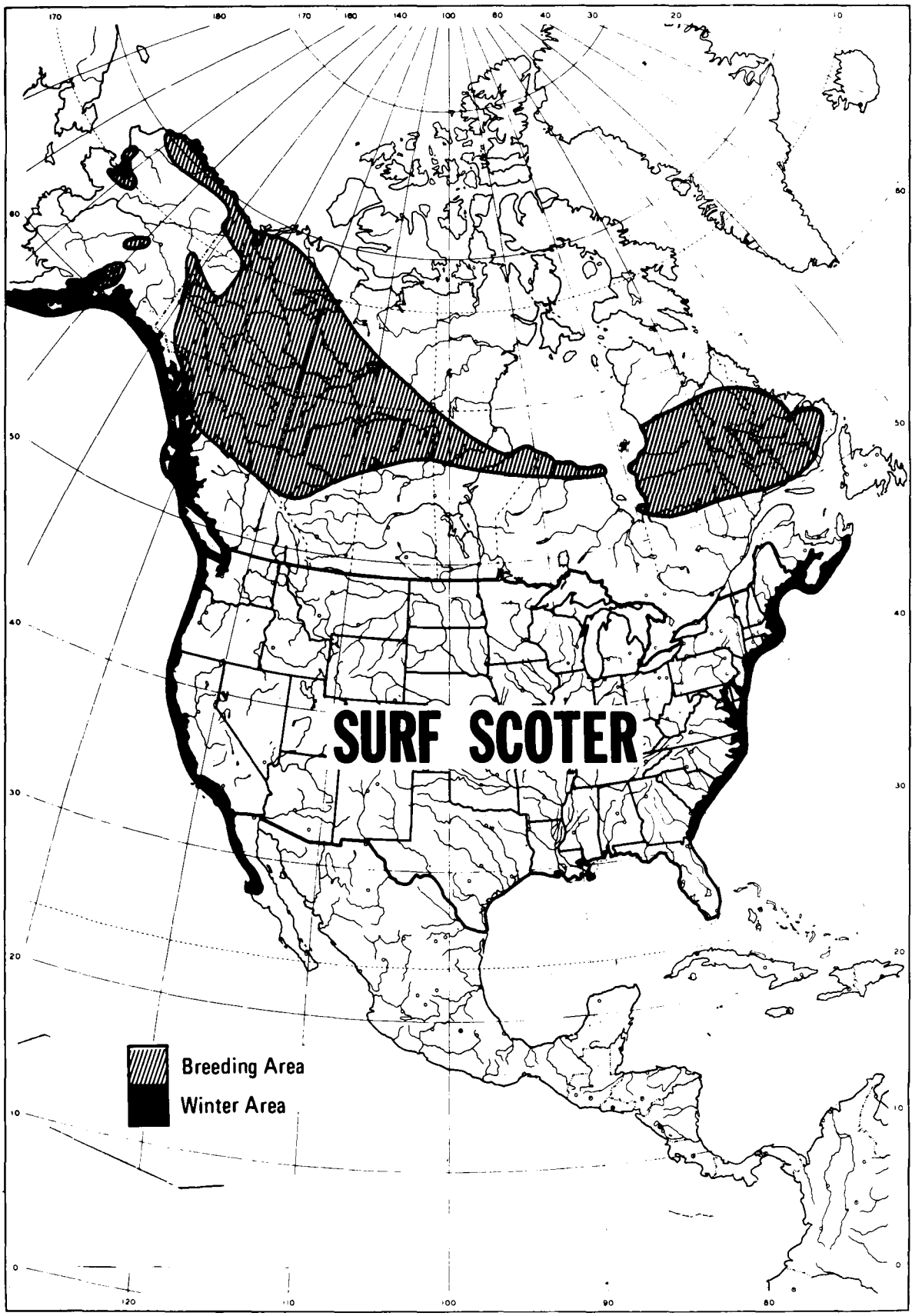
State Population 1973-1977 Average: 19,942

Flyway Population 1954-1976 Average: 65,906

Continental Population 1973-1977 Average: 84,678

\+ - % of Pacific Flyway
++ - % of Coast




SURF SCOTER
Breeding Area
Winter Area

MID-WINTER INVENTORY: BLACK SCOTER

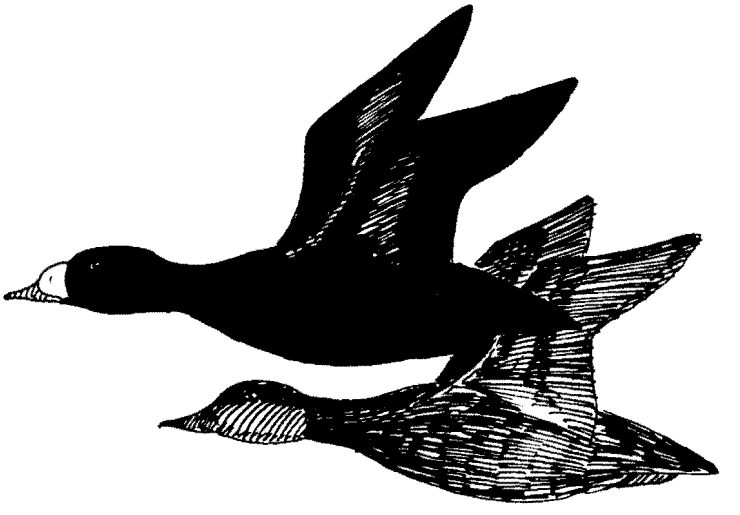
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	3,772	659 (17)+	265 (40)++	217 (33)++	177 (27)++
1976	3,214	1,232 (38)	481 (39)	573 (47)	178 (14)
1975	2,635	994 (38)	233 (23)	761 (77)	---
1974	1,657	383 (23)	41 (11)	342 (89)	---
1973	3,457	1,010 (29)	175 (17)	835 (83)	---

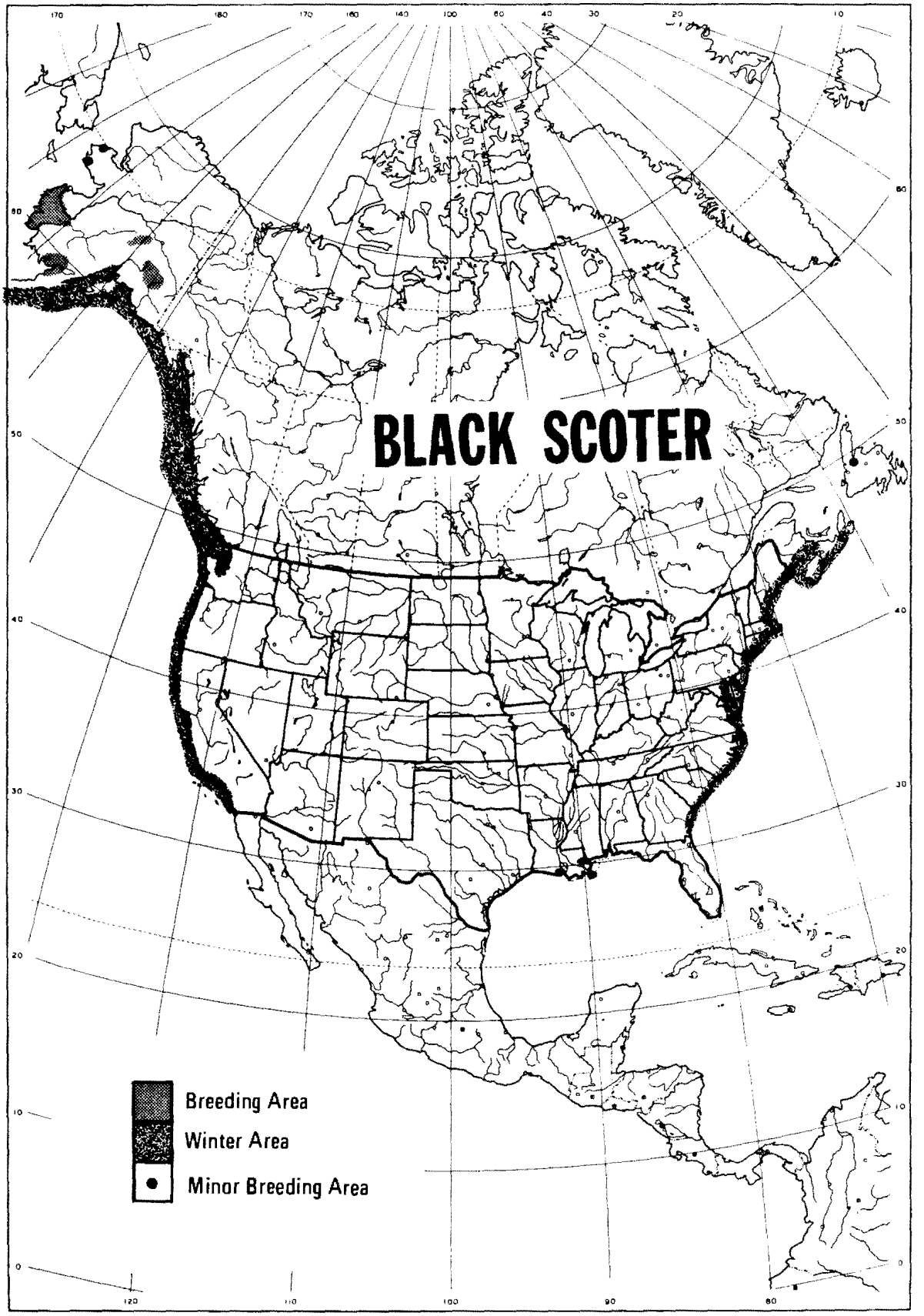
State Population 1973-1977 Average: 866

Flyway Population 1954-1976 Average: 2,866

Continental Population 1973-1977 Average: 14,217

\+ - % of Pacific Flyway
++ - % of Coast




BLACK SCOTER
Breeding Area
Winter Area
Minor Breeding Area

MID-WINTER INVENTORY: WHITE-WINGED SCOTER

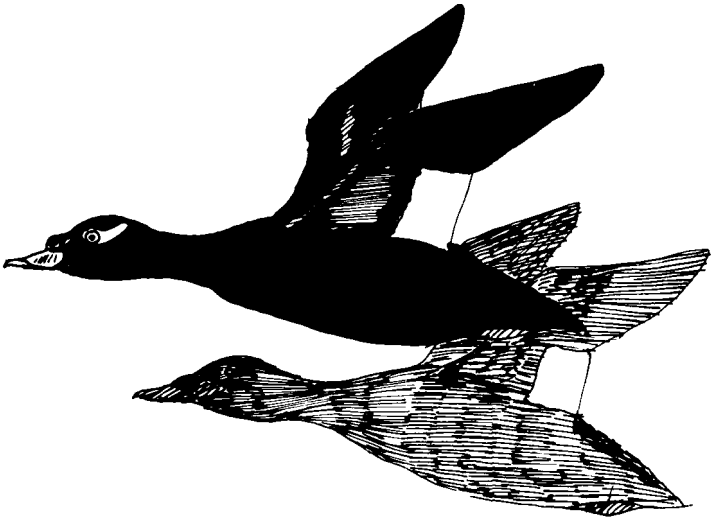
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	35,205	6,153 (17)+	2,474 (40)++	2,025 (33)++	1,653 (27)++
1976	29,992	11,499 (38)	4,488 (39)	5,348 (47)	1,662 (14)
1975	24,589	9,275 (38)	2,170 (23)	7,105 (77)	---
1974	15,462	3,572 (23)	382 (11)	3,189 (89)	---
1973	32,261	9,428 (29)	1,638 (17)	7,789 (83)	---

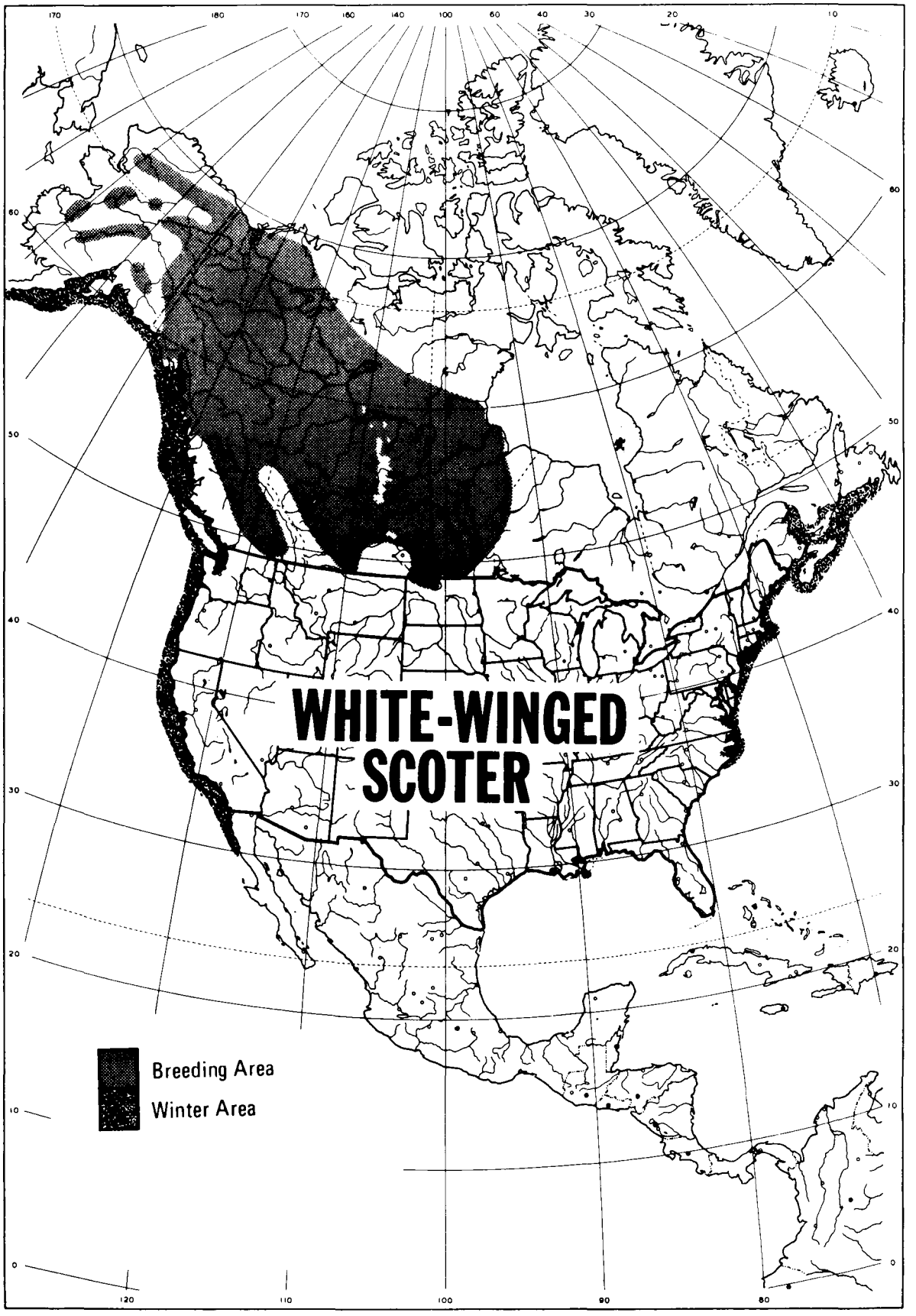
State Population 1973-1977 Average: 8,092

Flyway Population 1954-1976 Average: 26,745

Continental Population 1973-1977 Average: 55,678

\+ - % of Pacific Flyway
++ - % of Coast




WHITE-WINGED
SCOTER
Breeding Area
Winter Area

MID-WINTER INVENTORY: RUDDY DUCK

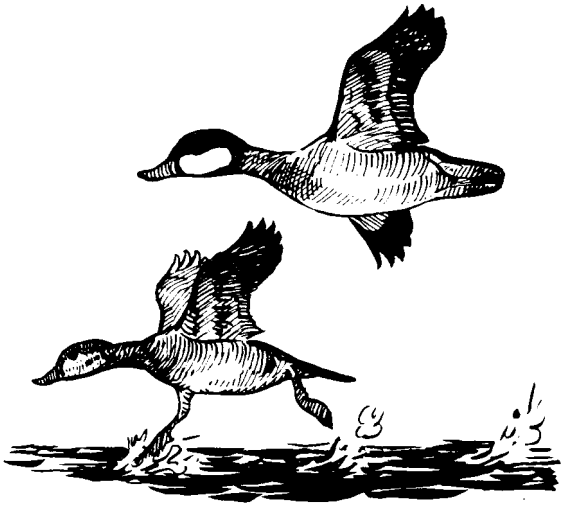
	Pacific Flyway	Coast Population	Humboldt Bay	San Francisco Bay	Marin-Sonoma Coastal Bays
1977	141,560	22,395 (16)+	2,230 (10)++	17,800 (79)++	2,365 (11)++
1976	108,443	17,805 (16)	4,350 (24)	12,200 (69)	1,255 (7)
1975	73,861	12,090 (16)	685 (6)	11,405 (94)	---
1974	126,504	15,623 (12)	9,373 (60)	6,250 (40)	---
1973	100,292	51,784 (52)	9,976 (20)	41,808 (80)	---

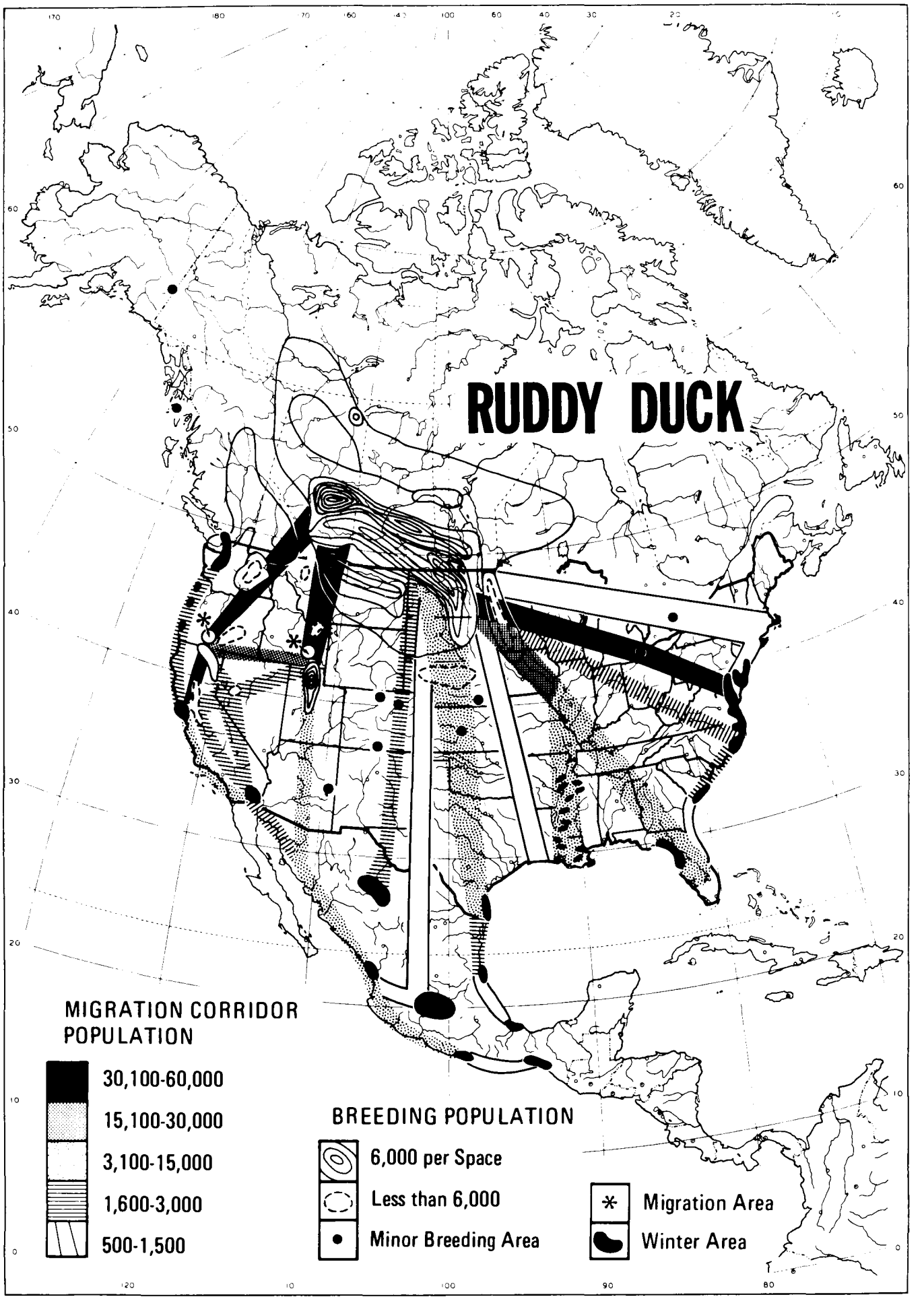
State Population 1973-1977 Average: 80,486

Flyway Population 1954-1976 Average: 117,426

Continental Population 1973-1977 Average: 180,116

\+ - % of Pacific Flyway
++ - % of Coast




RUDDY DUCK
MIGRATION CORRIDOR POPULATION
30,100-60,000
15,100-30,000
3,100-15,000
1,600-3,000
500-1,500
BREEDING POPULATION
6,000 per Space
Less than 6,000
Minor Breeding Area
Migration Area
Winter Area

APPENDIX C

HABITAT EVALUATION CRITERIA

APPENDIX C

CALIFORNIA COASTAL WETLANDS EVALUATION

Identification and ranking of wetlands of importance to waterfowl and the threat of loss of those wetlands normally involves the use of a check list of criteria (waterfowl use data; habitat types and quality, etc.) and numerical scores assigned to each criteria, based on the relative values of each wetland (e.g., one-to-ten). Wetlands receiving the highest total score in the biological value category would be ranked first. Those scored highest in the threat-of-loss category would be in most need of protection. Often, a combination of the two major categories is used to produce a combined final ranking. Score ranges would then be compiled to place wetlands in several preservation classifications for priority of ascertainment work. These procedures were used to rank wetlands in the Central Valley.

Where data are adequate, this detailed ranking process is the most efficient approach; but where the waterfowl use data for each wetland varies in quality and quantity, the ranking process breaks down. Under these circumstances, one wetland could be rated accurately in every category and, thus, receive a higher ranking than an equally valuable wetland of which little or no use data are available.

With few exceptions, adequate waterfowl use data are not available for California coastal wetlands. Existing data are woefully inadequate to assign relative importance values to the approximately 150 different coastal estuaries, lagoons, and freshwater ponds. Not only are total survey data for most areas lacking, but the most important species using each area are not known--except in a general sense. This absence of basic information about coastal wetlands is a serious impediment to the detailed analysis and evaluation of the biological importance of the coastal wetlands to waterfowl. Knowledge concerning threat of loss is a little better known, but not complete enough to make firm judgements on a quantitative basis.

As a result of the data shortcomings described, an approach to the ranking process was used which relied upon the general knowledge and professional judgement of FWS & CDFG field and staff migratory bird and waterfowl management personnel. Several biologists from each agency met to discuss waterfowl values along the coast and choose from a list of all coastal wetlands those areas of obvious importance to waterfowl. While this is far from the ideal system--given the variable or nonexistent quantitative waterfowl information available for the coast--this was the only practical approach. The analysis indicates that many of the coastal wetlands are too small, already protected in some fashion, or have high endangered species or unique ecosystem values, with acquisition likely under different funding programs.

CRITERIA

A set of Biological and Threat criteria were developed to guide judgments concerning the value of the coastal wetlands to waterfowl and the potential for loss of these areas. These criteria were used subjectively, with no attempt to quantify scores. Professional judgment was used to determine whether or not a wetland was retained in the list as having waterfowl value.

Description of Evaluation Criteria

I. Existing Wetlands

A. BIOLOGICAL VALUE TO WATERFOWL

1. Habitat Quality - Good habitat provides food, sanctuary, and low disease potential.

a. Food

b. Rest

c. Disease Potential

2. Size of Wetland - Small areas (25 acres or less) will be eliminated from consideration, unless they are part of a complex of small areas.

3. Location of Habitat with Respect to Existing Habitat

a. The relationship of important wetlands to existing NWRs and WMAs influences their value. Preservation of wetlands adjacent to existing refuges will preserve additional roosting and feeding grounds--thus guaranteeing waterfowl use over a larger area in perpetuity.

Conversely, it is desirable to increase the distribution of waterfowl so wetlands which enlarge the range of waterfowl populations will receive high consideration. Is the area in a "strategic" location?

b. Continuity of habitat north to south is an important consideration.

4. Location of Habitat with Respect to Wetland Losses and Urban/Industrial Development

a. The south coast has lost more habitat (85%) than the central and north coast (less than 60%). Habitat existing on

the south coast will be more valuable--all things equal--than similar habitat on the central and north coast.

b. Habitat near urban/industrial centers, if not deteriorated because of this juxtaposition, is at least as valuable as more remote areas.

5. Alternate Habitat

a. Coastal wetlands often take up the slack in dry years when inland areas are drier than normal. Wetlands supporting high waterfowl use in dry years should be included in the final listing.

b. This alternate habitat also provides depredation relief in the Central Valley.

6. Principal Species of Concern

All waterfowl species wintering along the California coast are important. However, several species winter in higher numbers elsewhere or use California primarily for breeding. The following list includes those species of which major populations relative to the total Pacific Flyway and/or California populations winter along the coast. The winter period is defined as October through March. Populations that use coastal habitat during this period are to be considered wintering birds.

This section will require subjective evaluation because quantitative survey data are not available for all wetlands to be considered.

a. Total Population - Total numbers of waterfowl, all species, supported by the wetland.

b. Wintering Populations-

Individual Species	California Coastal Wintering Populations	
	% of State	% of Pacific Flyway
1. Aleutian Canada Goose	100%	100%
2. Pacific Brant	100%	100%
3. Canvasback	100%	78%
4. Lesser Scaup	90%	20%
5. Greater Scaup	100%	65%
6. Redhead	14%	1%
7. Ruddy	30%	22%
8. Bufflehead	75%	16%
9. Goldeneyes	90%	3%
10. R. B. Merganser	100%	17%
11. W. W. Scoter	100%	3%
12. S. Scoter	100%	20%
13. B. Scoter	100%	0.4%
14. Pintail	2%	1%
15. Wigeon	6%	4%
16. Shoveler	5%	4%

A species is considered to be critically dependent upon coastal habitat during the winter period if (1) 75% to 100% of its California population is recorded in coastal habitats; or (2) at least 15% of the Pacific Flyway population is present along the California coast.

A species is considered to be reasonably dependent upon coastal habitat if (1) 25 to 75% of its California population is recorded in coastal areas; or (2) 5 to 15% of the Pacific Flyway population is present in coastal environments; or (3) if coastal habitat supports unusually large numbers of normally minor represented species at certain times--such as during drought.

c. Species Diversity - High species diversity (richness) would imply a high value for the wetland, even if total populations are not spectacular.

d. Endangered Waterfowl - A wetland supporting the Aleutian Canada goose should be considered in the final list. Species which might approach threatened or endangered status in the future should be given added emphasis where they use coastal habitat.

7. Endangered Species Other Than Waterfowl

The presence of significant endangered species resources in a coastal wetland would suggest that the area would best be preserved with LWCF or some other funding source other than MBCA, unless substantial waterfowl values are also represented.

8. Unique Ecosystem Aspects

The presence of an unusually high wildlife diversity with attendant habitat complex--such as high populations of waders, shore birds, raptors, gulls, terns, and other sea birds--and a diverse complex of fresh, brackish, and saline plant communities would indicate that LWCF or some other funding source would be most appropriate.

9. Hunting Program

If a waterfowl hunting program is or could be maintained without adversely affecting other wildlife resource values (e.g., large duck populations; low populations of other water birds and endangered species), this might serve as an indicator that the wetland(s) could be important to waterfowl above and beyond its other values.

10. Non-consumptive Use

If visitors to wetlands are there primarily to view waterfowl, as opposed to endangered species or other wildlife, this could be an indicator of overall waterfowl value.

11. Previous Coastal Resource Reports

Many reports have been prepared in the past describing and cataloguing coastal wetland resources. These reports normally list the top 10 or 25 estuarine areas, lagoons, and/or freshwater ponds of highest habitat value--overall--to coastal wildlife. These lists could serve as a basis for choosing those areas of most importance to waterfowl.

These reports include:

a. California Dept. of Fish & Game. Coastal Wetland Series 1-20.
Describe coastal wetland wildlife resources.

b. California Protected Waterways Plan
Resources Agency, February, 1971

Divided coastal wetlands into "Premium", "Very Good", and "Important" waterways.

c. Acquisition Priorities for the Coastal Wetlands of California Cooperative Report FWS & CDFG, April, 1974

Listed 65 wetlands, of which 25 were singled out as priority, and ten as top priority.

d. California Coastal Plan
California Coastal Zone Conservation Commission, December, 1975

Listed the 19 "most productive" coastal wetlands. Listed many more for acquisition.

e. State of California Coastal Management Program and Final Environmental Impact Statement
U.S. Dept. of Commerce, NOAA, OCZM, August, 1977

Referred to the California Coastal Plan and identified "Sensitive Coastal Resource Areas" (now called "Environmentally Sensitive Habitat Areas") for protection. These include marine and land habitat areas, wetlands, lagoons, and estuaries mapped and designated in the Coastal Plan.

B. THREATS TO THE HABITAT

1. Taxes

Local and County governments seeking to increase tax bases may encourage urban/industrial development of coastal wetlands. Wetlands with a high potential for tax-caused development would be considered to be under threat of loss.

2. Water Quality and Availability

Many coastal wetlands have had their freshwater supplies reduced because of upstream diversion for agriculture and urban-industrial use. Many coastal lagoons and estuaries have been cut off from the sea by fill and/or reduced freshwater outflow. Wetlands existing under these conditions have a high potential for continued degradation and loss.

3. Economic Incentives to Convert Wetlands to Other Land Uses

Wetlands have been diked and filled in the past, and these processes are continuing in some areas. The economic pressure to fill and develop coastal estuaries to make room for water and non-water oriented enterprises is still strong and could be responsible for wetland losses in the future--even with current coastal zone restrictions. A high potential for marina, restaurant, industrial, or urban development is evidence for a high threat of loss.

4. Industrial/Recreational/Urban Development

The kind of coastal developments vary widely in their effects on coastal wetlands. Small marinas or boat harbors may be compatible with wetland maintenance--large marinas, housing projects, and industrial siting are not. Areas pressured for development of the latter are under a greater threat of loss than the former.

5. Watershed Developments

Some of the most important threats to coastal wetlands originate in the watershed, away from the wetland itself. Logging, recreational homes, road construction, and industrial sites, and water diversion for agriculture can occur outside of the estuary proper and still have devastating consequences. Peripheral development increases the threat to a wetland.

6. Disturbance Factors - Public Use

Coastal wetlands are vulnerable to abuse from excessive human disturbance related to recreation and construction activities. Dogs and cats, also, cause problems for coastal wildlife. Potential conflicts from consumptive and non-consumptive uses of wetlands may influence waterfowl use.

Consumptive Use:	Non-Consumptive:	
Hunting	Boating	Picnicking
Fishing	Swimming	Scuba Diving
Shellfishing	Observation	Surfing
Bait Collecting	Hiking	Water-skiing
	Dune Buggies	

Wetlands with a great deal of any or all of the above activities could be suffering a continuing loss of waterfowl value.

7. Competing Resource Uses

Coastal wetlands are extremely productive of biological resources. Waterfowl are one of these resources but, increasingly, commercial shellfish enterprises (mariculture) will be competing with waterfowl for marshland. Areas with a high potential for commercial shellfishing would be considered to be under a threat of loss of waterfowl values.

8. California and Local Coastal Management Programs

The California Coastal Plan and Coastal Management Program were designed to preserve coastal wetlands--among other purposes. Nonetheless, local discretion is allowed in the preparation of Local Coastal Plans (LCPs). Wetland areas could be zoned for commercial development, housing, or boat harbors. Areas so designated would be under a very high threat of loss. Knowledge of LCPs will be mandatory to determine benefits and detriments of these plans with respect to coastal wetland protection.

9. Preservation Alternatives

There are many methods of coastal wetland protection available in California, including reliance on public trust, various permit procedures, two State Bond Acts, ecological preserve funding (personalized license plates), Coastal Zone planning, Coastal Management Program designated "Environmentally Sensitive Habitat Areas", CDFG, State Parks & Recreation Dept., WCB, and others. Areas will be considered to be under less threat if acquisition or preservation by one of these methods appears assured.

II. New Wetland Development

There is great potential along the coast to inexpensively restore diked tidelands. Those wetland areas containing significant areas diked, drained, and/or filled, which could be restored as tidal marsh with reasonable effort in time and money, will be identified.

These areas would be of high value to waterfowl after restoration.

The desirability, potential biological value to waterfowl, and the feasibility for development should be considered.

APPENDIX D

KEY WETLANDS REQUIRING PROTECTION

COAST OF CALIFORNIA

D-I ONGOING/AUTHORIZED PROJECTS

APPENDIX D-1

AREA: SOUTH SAN FRANCISCO BAY

1. Overall Value: Exceptionally High

2. Habitat Present:

   Fresh Yes
   Brackish Yes
   Salt Yes
   Uplands Yes
   Restorable wetlands Yes

   Benefits existing NWR or WMA Yes

   Promotes wider distribution of waterfowl Yes

   Alternate habitat early and during drought Yes

3. Disease a Problem? Yes

4. Waterfowl Value

   Geese Low
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other Low

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler High

   Divers High
   - Canvasback High
   - Greater Scaup High
   - Lesser Scaup High
   - Ruddy Duck High

   Sea Ducks Moderate
   - Scoter High
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Unique Ecosystem/Endangered Species Values Low/High

6. Consumptive Use Yes
   Nonconsumptive Use Yes

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

   Urban development; water quality deterioration.
   Commercial-industrial development & pollution;
   Oil spills from shipping.

9. Proposed Action:

   Ascertainment studies will be initiated to determine the feasibility for expansion of the refuge, including potential for restoration of diked former tidelands.

South San Francisco Bay



APPENDIX D-1

AREA: NAPA MARSHES

1. Overall Value: Exceptionally High

2. Habitat Present:

Fresh No
Brackish Yes
Salt Yes
Uplands Yes
Restorable wetlands Yes

Benefits existing NWR or WMA Yes

Promotes wider distribution of waterfowl Yes

Alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Waterfowl Value

Geese Low
- Pacific Brant None
- Aleutian Canada goose None
- Other Low

Dabblers High
- Pintail High
- Wigeon High
- Shoveler Moderate

Divers High
- Canvasback High
- Greater Scaup Moderate
- Lesser Scaup Moderate
- Ruddy Duck High

Sea Ducks Low
- Scoter Low
- Merganser Low
- Goldeneye Low
- Bufflehead Low

5. Unique Ecosystem/Endangered Species Values Low/High

6. Consumptive Use Yes
Nonconsumptive Use Yes

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

Urbanization, commercial & industrial development, highway construction, water quality deterioration from upstream diversion and sewage effluent, flood control projects, & maintenance dredging are real & potential threats.

9. Proposed Action:

It is proposed that the FWS continue acquisition of San Pablo Bay NWR as authorized. Ascertainment studies will be initiated to determine the feasibility for acquiring and restoring diked todelands outside of approved boundaries for inclusion in the NWR system.

Napa Marshes



APPENDIX D-1

AREA: HUMBOLDT BAY

1. Overall Value: Exceptionally High

2. Habitat Present:

   Fresh Yes
   Brackish Yes
   Salt Yes
   Uplands Yes
   Restorable wetlands Yes

   Benefits existing NWR or WMA Yes

   Promotes wider distribution of waterfowl Yes

   Alternate habitat early and during drought Yes

3. Disease a Problem? Yes

4. Waterfowl Value

   Geese High
   - Pacific Brant High
   - Aleutian Canada goose Low
   - Other

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon High
   - Shoveler Moderate

   Divers Moderate
   - Canvasback Low
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Moderate
   - Scoter High
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Unique Ecosystem/Endangered Species Values Moderate/Low

6. Consumptive Use High
   Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

   Threat of loss from housing & marina development.

9. Proposed Action:

   Continue acquisition of Humboldt Bay NWR as approved. Ascertainment studies be initiated to determine the feasibility of acquiring and restoring additional habitat, after approved acreage is acquired, for inclusion in the NWR system.

Humboldt Bay



APPENDIX D-1

AREA: LAKES EARL AND TALAWA

1. Overall Value: Exceptionally High

2. Habitat Present:

Fresh Yes
Brackish Yes
Salt No
Uplands Yes
Restorable wetlands No

Benefits existing NWR or WMA Yes

Promotes wider distribution of waterfowl Yes

Alternate habitat early and during drought Yes

3. Disease a Problem? Yes

4. Waterfowl Value

Geese Low
- Pacific Brant No
- Aleutian Canada goose Low
- Other Low

Dabblers High-Moderate
- Pintail Moderate
- Wigeon High
- Shoveler Low

Divers High
- Canvasback High
- Greater Scaup High
- Lesser Scaup Low
- Ruddy Duck High

Sea Ducks Low
- Scoter Low
- Merganser Low
- Goldeneye Low
- Bufflehead Moderate

5. Unique Ecosystem/Endangered Species Values Moderate/Moderate

6. Consumptive Use Moderate
Nonconsumptive Use Moderate

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

There is threat from housing projects.

9. Proposed Action:

The State has an acquisition plan for this area. It is proposed that the FWS not get involved unless needed. If such a need is realized, ascertainment studies will be initiated to determine the feasibility of acquiring this area for the NWR system.

Lake Earl



APPENDIX D-1

AREA: PETALUMA MARSH

1. Overall Value: Exceptionally High

2. Habitat Present:

   Fresh Yes
   Brackish Yes
   Salt Yes
   Uplands Yes
   Restorable wetlands Yes

   Benefits existing NWR or WMA Yes

   Promotes wider distribution of waterfowl Yes

   Alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Waterfowl Value

   Geese Low
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other Low

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler High

   Divers High
   - Canvasback High
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Low

5. Unique Ecosystem/Endangered Species Values Low/Moderate

6. Consumptive Use Yes
   Nonconsumptive Use Yes

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

   Urban development; agricultural development.

9. Proposed Action:

   The State is acquiring. It is proposed that the FWS not get involved unless needed. If such need is realized, ascertainment studies will be initiated to determine the feasibility of acquiring this area for the NWR system.

Petaluma Marsh



D-2 RESTORATION PROJECTS

APPENDIX D-2
(Restorable wetlands)

AREA: NAPA MARSHES

1. Potential Overall Value Exceptionally High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese Low
   - Pacific Brant No
   - Aleutian Canada goose No
   - Other Low

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler High

   Divers High
   - Canvasback High
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck High

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Low

5. Potential Unique Ecosystem/Endangered Species Values Low/High

6. Potential Consumptive Use High
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Urban-industrial development.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring diked former tidelands to restore marshes. Add to San Pablo NWR.

Napa Marshes



APPENDIX D-2
(Restorable wetlands)

AREA: PETALUMA MARSH

1. Potential Overall Value Exceptionally High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese Low
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other Low

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler High

   Divers High
   - Canvasback High
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Low

5. Potential Unique Ecosystem/Endangered Species Values Low/Moderate

6. Potential Consumptive Use Moderate
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

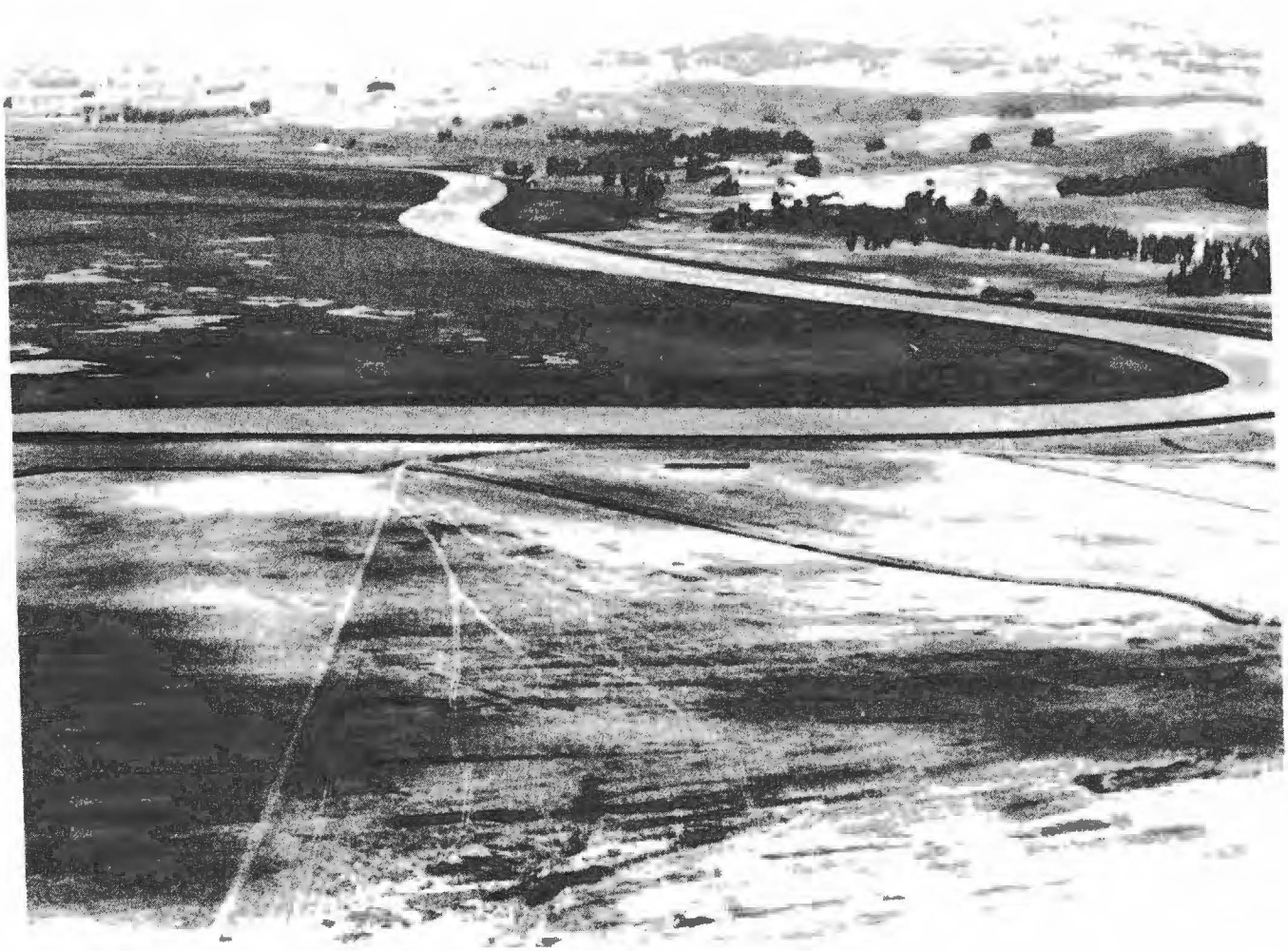
8. Threat of Loss of opportunity to restore wetlands:

   Continued agriculture; urban expansion in diked areas.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring diked former tidelands to restore marsh. Include in NWR system.

Petaluma Marsh



APPENDIX D-2
(Restorable wetlands)

AREA: GALLINAS CREEK MARSH

1. Potential Overall Value High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese Low
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other Low

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler High

   Divers Moderate
   - Canvasback Moderate
   - Greater Scaup Low
   - Lesser Scaup Low
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Low/Low

6. Potential Consumptive Use Moderate
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Continued agriculture;urban-commercial expansion in diked areas.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring diked former tidelands to restore marsh.
   Include in NWR system.

Gallinas Creek Marsh



APPENDIX D-2
(Restorable wetlands)

AREA: NOVATO CREEK MARSH

1. Potential Overall Value High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese Low

   Pacific Brant None
   Aleutian Canada goose None
   Other Low

   Dabblers High

   Pintail High
   Wigeon High
   Shoveler High

   Divers Moderate

   Canvasback Moderate
   Greater Scaup Low
   Lesser Scaup Low
   Ruddy Duck Moderate

   Sea Ducks Low

   Scoter Low
   Merganser Low
   Goldeneye Low
   Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Low/Low

6. Potential Consumptive Use Moderate
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Continued agriculture; urban-commercial expansion on diked areas.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring diked former tidelands to restore marsh. Include in NWR system.

Novato Creek Marsh



APPENDIX D-2
(Restorable wetlands)

AREA: SAN RAFAEL CREEK MARSH

1. Potential Overall Value High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese None

   Pacific Brant None
   Aleutian Canada goose None
   Other None

   Dabblers High

   Pintail High
   Wigeon High
   Shoveler High

   Divers Moderate

   Canvasback Moderate
   Greater Scaup Low
   Lesser Scaup Low
   Ruddy Duck Moderate

   Sea Ducks Low

   Scoter Low
   Merganser Low
   Goldeneye Low
   Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Low/Low

6. Potential Consumptive Use Low
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Imminent threat of loss to development proposal. Remaining marsh is behind dikes & subject to easy fill. Corps of Engineers position of fill permit not known. CDFG trying to get area preserved & returned to tidal action.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring and restoring tidal marsh. Include in San Pablo NWR.

San Rafael Creek Marsh



APPENDIX D-2
(Restorable wetlands)

AREA: NORTH RICHMOND MARSH

1. Potential Overall Value Moderate

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese None
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other None

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon Low
   - Shoveler Moderate

   Divers Moderate
   - Canvasback Moderate
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Low

5. Potential Unique Ecosystem/Endangered Species Values No/No

6. Potential Consumptive Use Low
   Potential Nonconsumptive Use Low

7. Identified as important in previous reports No

8. Threat of Loss of opportunity to restore wetlands:

   Industrial-commercial expansion.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring and restoring tidal marsh. Include in San Pablo Bay NWR.

North Richmond Marsh



APPENDIX D-2
(Restorable wetlands)

AREA: SOUTH SF BAY

1. Potential Overall Value Exceptionally High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? Moderate

4. Potential Waterfowl Value

   Geese Low
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other Low

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler High

   Divers High
   - Canvasback Moderate
   - Greater Scaup High
   - Lesser Scaup High
   - Ruddy Duck High

   Sea Ducks Moderate
   - Scoter High
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Low/High

6. Potential Consumptive Use Moderate
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Continued salt production; urban development in non-NWR salt ponds when Leslie goes out of salt production.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring and restoring tidal marsh. In lude in NWR system.

South San Francisco Bay



APPENDIX D-2
(Restorable wetlands)

AREA: HUMBOLDT BAY-MAD RIVER SLOUGH

1. Potential Overall Value High

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? Moderate

4. Potential Waterfowl Value

   Geese High
   - Pacific Brant High
   - Aleutian Canada goose Low
   - Other Low

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon High
   - Shoveler Moderate

   Divers Moderate
   - Canvasback Low
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Moderate
   - Scoter High
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Moderate/Low

6. Potential Consumptive Use High
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Urban-commercial expansions into diked areas.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring diked former tidelands, restoring marsh, and incorporating into Humboldt Bay NWR.

Humboldt Bay



APPENDIX D-2
(Restorable wetlands)

AREA: BOLSA CHICA - SANTA ANA RIVER

1. Potential Overall Value Moderate to High

2. Potential Habitat Development:

   Fresh Yes
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA No

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese Low
   - Pacific Brant Low
   - Aleutian Canada goose None
   - Other Low

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon Moderate
   - Shoveler Moderate

   Divers Moderate
   - Canvasback Low
   - Greater Scaup Low
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Moderate/High

6. Potential Consumptive Use Very Low
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Continued oil field development, harbor expansion, pollution.

9. Proposed Action:

   Proceed with ascertainment study to determine feasibility of acquiring the diked former tidelands, restoring marsh, and incorporating in NWR system.

Bolsa Chica



APPENDIX D-2
(Restorable wetlands)

AREA: MORO COJO SLOUGH - OLD SALINAS RIVER

1. Potential Overall Value Moderate

2. Potential Habitat Development:

   Fresh Yes
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese Low
   - Pacific Brant Low
   - Aleutian Canada goose None
   - Other None

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon Moderate
   - Shoveler Moderate

   Divers Low
   - Canvasback Low
   - Greater Scaup Low
   - Lesser Scaup Low
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Low

5. Potential Unique Ecosystem/Endangered Species Values No/No

6. Potential Consumptive Use Moderate
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Urbanization in diked areas.

9. Proposed Action:

   Initiate ascertainment studies to determine feasibility of acquiring diked former marsh areas, restoring marsh and incorporating into NWR system.

Moro Cojo Slough



APPENDIX D-2
(Restorable wetlands)

AREA: TOMALES BAY

1. Potential Overall Value Moderate

2. Potential Habitat Development:

   Fresh No
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Potential Waterfowl Value

   Geese High
   - Pacific Brant High
   - Aleutian Canada goose None
   - Other Low

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon Moderate
   - Shoveler Moderate

   Divers Moderate
   - Canvasback Moderate
   - Greater Scaup Low
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Moderate
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Low/Low

6. Potential Consumptive Use Low
   Potential Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Continue pasture; development in diked area.

9. Proposed Action:

   Initiate ascertainment studies to determine feasibility of acquiring and restoring diked former tidelands to productive marsh. Incorporate into NWR system.

Tomales Bay



APPENDIX D-2
(Restorable wetlands)

AREA: EEL RIVER DELTA

1. Potential Overall Value High

2. Potential Habitat Development:

   Fresh Yes
   Brackish Yes
   Salt Yes
   Uplands Yes

   Potential benefit to existing NWR or WMA Yes

   Would promote wider distribution of waterfowl Yes

   Would provide alternate habitat early and during drought Yes

3. Disease a Problem? Yes

4. Potential Waterfowl Value

   Geese Moderate
   - Pacific Brant Low
   - Aleutian Canada goose Low
   - Other Low

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon High
   - Shoveler Moderate

   Divers Moderate
   - Canvasback Low
   - Greater Scaup Moderate
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Moderate
   - Scoter Moderate
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Potential Unique Ecosystem/Endangered Species Values Low/Low

6. Potential Consumptive Use Moderate
   Potential Nonconsumptive Use Moderate

7. Identified as important in previous reports Yes

8. Threat of Loss of opportunity to restore wetlands:

   Flood control with development of present diked agricultural lands.

9. Proposed Action:

   Initiate ascertainment studies to determine the feasibility of acquiring diked former tidelands, restoring marsh, and incorporating into Humboldt Bay NWR.

Eel River Delta



D-3 NON-TIDAL MARSH PROJECTS

APPENDIX D-3

AREA: DUNE-OSO FLACO LAKES-SANTA MARIA RIVER

1. Overall Value: Very High

2. Habitat Present:

   Fresh Yes
   Brackish No
   Salt No
   Uplands Yes
   Restorable wetlands No

   Benefits existing NWR or WMA No

   Promotes wider distribution of waterfowl Yes

   Alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Waterfowl Value

   Geese Low
   - Pacific Brant Low
   - Aleutian Canada goose None
   - Other None

   Dabblers High
   - Pintail High
   - Wigeon High
   - Shoveler Moderate

   Divers Low/Moderate
   - Canvasback Low
   - Greater Scaup Low
   - Lesser Scaup Moderate
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Low

5. Unique Ecosystem/Endangered Species Values High/High

6. Consumptive Use Yes - Ducks Clubs
   Nonconsumptive Use Low

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

   Off road vehicles; urbanization.

9. Proposed Action:

   This area has very high unique ecosystem endangered species values. It has been nominated for inclusion in California State Unique Ecosystem Concept Plan. Should that plan recommend preservation with LWCF money, it is proposed that funding source take precedence over migratory bird funding. An easement approach is recommended in either case. Initiate ascertainment studies to determine feasibility of acquiring thisaarea, in fee or easement, if it is decided to use MBCA.



APPENDIX D-3

AREA: WHELAN LAKE

1. Overall Value: High

2. Habitat Present:

Fresh Yes
Brackish No
Salt No
Uplands Yes
Restorable wetlands No

Benefits existing NWR or WMA No

Promotes wider distribution of waterfowl Yes

Alternate habitat early and during drought No

3. Disease a Problem? No

4. Waterfowl Value

Geese High
- Pacific Brant None
- Aleutian Canada goose None
- Other High

Dabblers Moderate
- Pintail Moderate
- Wigeon Moderate
- Shoveler Moderate

Divers Low
- Canvasback Low
- Greater Scaup None
- Lesser Scaup None
- Ruddy Duck Low

Sea Ducks Low
- Scoter None
- Merganser None
- Goldeneye None
- Bufflehead Low

5. Unique Ecosystem/Endangered Species Values Possible/None

6. Consumptive Use No
Nonconsumptive Use High

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

Present owner cannot adequately patrol, wants to retain as sanctuary. Lake is irrigation reservoir so relatively secure. Area is a goose management problem.

9. Proposed Action:

Initiate ascertainment studies to determine best course of action to preserve this unique coastal Canada goose area. Acquisition is one option, cooperative management is another. Include San Luis Rey River Corridor in ascertainment study.

Whelan Lake



APPENDIX D-3

AREA: McCLUSKY SLOUGH

1. Overall Value: Moderate

2. Habitat Present:

   Fresh Yes
   Brackish No
   Salt No
   Uplands Yes
   Restorable wetlands Yes

   Benefits existing NWR or WMA Yes

   Promotes wider distribution of waterfowl Yes

   Alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Waterfowl Value

   Geese Low
   - Pacific Brant None
   - Aleutian Canada goose None
   - Other Low

   Dabblers Moderate
   - Pintail Moderate
   - Wigeon Moderate
   - Shoveler Moderate

   Divers Low
   - Canvasback Low
   - Greater Scaup Low
   - Lesser Scaup Low
   - Ruddy Duck Moderate

   Sea Ducks Low
   - Scoter Low
   - Merganser Low
   - Goldeneye Low
   - Bufflehead Moderate

5. Unique Ecosystem/Endangered Species Values Possible/No

6. Consumptive Use High
   Nonconsumptive Use Low

7. Identified as important in previous reports No

8. Threat of Habitat Loss:

   The biggest problem is water quantity during fall and winter. Only in wet years is habitat in good condition.

9. Proposed Action:

   Initiate ascertainment studies to determine feasibility of acquisition of existing marsh with rehabilitation and incorporation into NWR system.

McClusky Slough



APPENDIX D-3

AREA: MUGU LAGOON DUCK CLUB AREA

1. Overall Value: High

2. Habitat Present:

Fresh Yes
Brackish No
Salt No
Uplands Yes
Restorable wetlands Yes

Benefits existing NWR or WMA Yes

Promotes wider distribution of waterfowl Yes

Alternate habitat early and during drought Yes

3. Disease a Problem? No

4. Waterfowl Value

Geese None
- Pacific Brant None
- Aleutian Canada goose None
- Other None

Dabblers High
- Pintail High
- Wigeon High
- Shoveler Moderate

Divers Low
- Canvasback Low
- Greater Scaup Low
- Lesser Scaup Low
- Ruddy Duck Moderate

Sea Ducks Low
- Scoter Low
- Merganser Low
- Goldeneye Low
- Bufflehead Low

5. Unique Ecosystem/Endangered Species Values No/No

6. Consumptive Use Yes - Duck Clubs
Nonconsumptive Use Low

7. Identified as important in previous reports Yes

8. Threat of Habitat Loss:

Taxes; conversion to other uses; urbanization-commercial development are potential threats, but area is now secure.

9. Proposed Action:

Initiate ascertainment studies to determine potential for conservation easements to preserve the habitat on the duck clubs if threats materialize.



APPENDIX E

Reasons for Including or Eliminating Coastal Wetlands from Consideration for MBCA Acquisition

REGION: NORTH COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
1.	Smith River Delta	4,975	170,000 use-days. Moderate value	Aleutian Canada goose; Bald Eagle Peregrine/Potential UE value.	House develop flood control in future	No, minor restoration potential.
2.	Lakes Earl and Talawa	2,560	1.8 million use-days. Very high value	Aleutian Canada goose; Bald Eagle Peregrine. High UE value.	Housing Development	Yes, but State DPR & DFG are proposing acquisition; FWS involvement only if necessary.
3.	Dead Lake	50	Low use	No/Potential UE value.	Airport is adjacent	No, waterfowl value not demonstrated.
4.	Klamath River Estuary	400	300 counted. Low value-lack of aquatic food	Bald Eagle, Peregrine/Potential UE value	None	No, waterfowl value not demonstrated; open bay habitat secure.
5.	Redwood Creek Estuary	80	Little use. Marsh habitat very limited	No/No	None	No, included in National Park waterfowl value not demonstrated.
6.	Freshwater Lagoon	245	15,000 use-day limited use	No/No	None	No, included in State Park.
7.	Stone Lagoon	520	670,000 use-days. High value	Bald Eagle; Brown Pelican/No	None	No, included in State Park.
8.	Dry Lagoon	80	165,000 use-days in 1972. Moderate value	No/No	None	No, included in State Park.

REGION: NORTH COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
9.	Big Lagoon	1,470	235,000 use-days. Moderate value	Peregrine Falcon Brown Pelican/ Potential UE value	Filling; sedimentation	No, State Wildlife Area State Lands Division lease. State Parks proposed acquisition.
10.	Mad River Estuary	100	15,000 use-days. Limited value	Peregrine, Bald Eagle/Potential UE value	None	No, waterfowl value not demonstrated; open bay habitat secure.
11.	Mad River Slough	450	High value. No quantitative data	Aleutian Canada goose, Peregrine, Bald Eagle/Potential UE value	Private ownership	Yes, addition to Humboldt Bay NWR of 150 acres of salt marsh. Restoration potential is high.
12.	Humboldt Bay	16,000	6.0 million use-days. Extremely high value	Aleutian Canada goose, Brown Pelican, Peregrine, Bald Eagle, California Clapper Rail/Potential UE value	Marina development	Yes, go ahead with proposed NWR. High restoration potential outside proposed NWR boundary.
13.	Eel River Delta	8,700	1.4 million use-days. Very high	Aleutian Canada goose, Peregrine Falcon, California Clapper Rail, Bald Eagle, Brown Pelican/Potential UE value.	Flood control dams possible in future	Yes, high restoration potential.
14.	Mattole River Estuary	175	Low use; wetland very limited	Brown Pelican, Peregrine/Possible UE value	None	No, waterfowl value not demonstrated; open bay habitat secure.
15.	Bear Harbor	2	Very low	No/No	None	No, too small; waterfowl value not demonstrated.

REGION: NORTH COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
16.	Jackass Creek Estuary	3	Very low	No/No	None	No, too small; waterfowl value not demonstrated.
17.	Usal Creek Estuary	10	Very low	Brown Pelican possible/Potential UE value	None	No, too small; waterfowl value not demonstrated.
18.	Cottoneva Creek Estuary	14	Very low	Brown Pelican possible/Potential UE value	None	No, too small; waterfowl value not demonstrated.
19.	Hardy Creek Estuary	6	Very low	Brown Pelican possible/Potential UE value	None	No, too small; waterfowl value not demonstrated.
20.	Ten Mile River Estuary	170	40 ducks Feb. No other data available	Peregrine, Brown Pelican possible/Potential UE value	Home & Recreation sites	No, waterfowl value not demonstrated.
21.	Inglenook Creek Estuary	5	Very low use	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.
22.	Sandhill Lake	25	Low use	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.
23.	Lake Cleone	32	Low use	Brown Pelican/ Potential UE value	None	No, included in a State Park.
24.	Pudding Creek Estuary	58	43 ducks counted in February, 1978. Low use	Brown Pelican/ Potential UE value	Housing; disturbance	No, not appropriate habitat; waterfowl value not demonstrated.

REGION: NORTH COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
25.	Noyo River Estuary & Bay	82	54 ducks counted February, 1978. Low use	Brown Pelican, Peregrine/ Potential UE value	Housing development	No, waterfowl value not demonstrated; open bay habitat secure.
26.	Casper Creek Estuary	13	February census recorded 0 ducks Low use	Brown Pelican/ Potential UE value	None	No, too small; waterfowl value not demonstrated.
27.	Big River Estuary	150	16 ducks counted January 1978. Low use	Brown Pelican, Bald Eagle, Peregrine/ Potential UE value	Fill; housing	No, waterfowl value not demonstrated; open bay habitat secure.
28.	Little River Estuary	2	Habitat very limited. Low use	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.
29.	Albion river Estuary	145	70 ducks early February, 1978 Low use	Bald Eagle, Brown Pelican possible, Peregrine/Potential UE value	Housing	No, threat not great enough; waterfowl value not demonstrated open bay habitat secure.
30.	Big Salmon Creek Estuary	9	January 26,1978 census yielded no ducks	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.
31.	Navarro River Estuary	126	20 ducks counted February 1978. Low use	Peregrine, Bald Eagle/Potential UE value	None	No, waterfowl value not demonstrated; open bay habitat secure.
32.	Greenwood Creek Estuary	14	No data. Low use	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.
33.	Elk Creek Estuary	17	No data. Low use	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.

REGION: NORTH COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
34.	Alder Creek Estuary	9	No data. Low use	No/Potential UE value	None	No, too small; waterfowl value not demonstrated.
35.	Laguna Creek Marsh	20	Low value	No/Potential UE value	Low	No, too small; waterfowl value not demonstrated.
36.	Brush Creek Estuary	2	Low value	No/No	None	No, too small; waterfowl value not demonstrated; State Park.
37.	Hunter's Lagoon	86	Fairly low use 15 ducks Feb. 1978. 14 sp. sum. 1975	Brown Pelican possible/Potential	Low	No, waterfowl value not demonstrated.
38.	Garcia River Estuary	200	300 swans, 165 ducks counted Feb. 1978. Moderate use	Peregrine, Bald Eagle, Brown Pelican/Potential UE value	None	No, open water habitat is secure.
39.	Hathaway Creek Marsh	80	280 swans, 3 ducks & 1 brant counted Feb.1978	No/Potential UE value	Low	No, marginal in size. High waterfowl value not demonstrated.
40.	Gualala River Esturay	100	Low	Peregrine, Bald Eagle, Brown Pelican/Potential UE value	Housing; Highway, disturbance	No, waterfowl value not demonstrated; open water habitat is secure.

REGION: NORTH CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
41.	Russian River Estuary	400	Low. No data available	Brown Pelican, Peregrine/High UE value	None	No, waterfowl value not demonstrated; open water habitat secure.
42.	Salmon Creek Lagoon	40	Low. No data available	Brown Pelican/ Potential UE value	Housing possible	No, half included in State Beach; waterfowl value not demonstrated.
43.	Bodega Harbor	935	113,000 use-days Nov. & Dec. only High use	Peregrine, Bald Eagle, Brown Pelican/High UE value	Fill; dredge, housing possible	No, area is secure; most habitat is open bay; much local & State interest in preserving the Bay.
44.	Estero Americano	340	40,000 use-days Low use	Peregrine, Bald Eagle/High UE value	No	No, low waterfowl use; area is secure.
45.	Estero de San Antonio	155	17,000 use-days low use	Peregrine, Bald Eagle/High UE value	No	No, low waterfowl use, area is secure.
46.	Tomales Bay	9,000	640,000 use-days Nov. & Dec. only very high use	Peregrine, Bald Eagle, Brown Pelican/No	Minor; City Park detrimental to grass beds	Yes, Restoration potential. CDFG ER present. High interest to preserve by locals.
47.	Point Reyes Ponds and Bays:					
48.	Abbott's Lagoon	170	113,000 use-Moderate use	Brown Pelican/No	None	No, National Seashore.
49.	D. Ranch Pond	25	No data	Brown Pelican/No	None	No, National Seashore.
50.	Drake's/Limantour Estero	2,070	407,000 use-days. High use	Peregrine possible, Brown Pelican/No	None	No, National Seashore.
51.	Wildcat Lake	9	No data	No/No	None	No, National Seashore

REGION: NORTH CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
52.	Ocean Lake	7	No data	No/No	None	No, National Seashore.
53.	Crystal Lake	17	No data	No/No	None	No, National Seashore.
54.	Pelican Lake	21	No data	No/No	None	No, National Seashore.
55.	Bass Lake	14	No data	No/No	None	No, National Seashore.
56.	Bolinas Lagoon	1,400	190,000 use-days. High use	California Clapper Rail, Brown Pelican, Peregrine, Bald Eagle. High UE value	Boating Marinas Housing on uplands.	No, county owns most, Audubon Canyon Ranch; Public forest; strong local interest in preservation.
57.	Rodeo Lagoon	38	No data. Low use	Brown Pelican/No	Low	No, included in Fort Cronkite-Barry Military reservations and Marin Headlands State Park.

REGION: SNA FRANCISCO BAY AREA

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
58.	Petaluma Marsh	3,800	65,000 use-days Nov. & Dec.1977 4,000 ducks at one time. High use	Peregrine possible/ Potential UE value	Housing	Yes, High restoration potential. State acquiring existing marsn.
59.	Gallinas Creek Marsh	850	No quantitative data available. High use	California Clapper Rail, salt marsh harvest mouse, Black Rail/No	Low	Yes, High restoration potential.
60.	Cotre Madera Marsh	200	1.6 million use-days. (a conservative figure)	California Clapper Rail, salt marsh harvest mouse, Black Rail/No	Shopping Center Proposal	No, 70 acres preserved as ER; other 130 acres slated for ER as mitigation for ferry terminal.
61.	San Rafael Creek Marsh	200	1.3 million use-days. High use.	No/No	Imminent development proposed.	Yes, diked marsh is in immediate danger; acquisition & development will enhance waterfowl values.
62.	San Pedro Marsh	50	No quantitative data available	No/No	Diked; could be developed	No, poor restoration potential.
63.	Novato Creek Marsh	130	No quantitative data. High	California Clapper Rail, Black Rail, Salt marsh harvest mouse/No	None or low	Yes, high restoration potential.
64.	Napa Marshes	10,000	1.4 million use-days (a conservative figure)	California Clapper Rail, Black Rail, Salt marsh harvest mouse, Peregrine possible/No	Low	Yes, high waterfowl value demonstrated; San Pablo NWR acquisition is continuing; high restoration potential.

REGION: SAN FRANCISCO BAY AREA

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
65.	San Pablo Bay	35,000	1.5 million use-days (conservative)	No/No	None	No, important Bay waters already in NWR or wildlife area.
66.	South Hampton Bay	300	No data available. Mod. use	California Clapper Rail, Black Rail/No	None	No, area is a State Park.
67.	North Richmond Marsh	400	300,000 use-days	California Clapper Rail, Black Rail, Salt marsh harvest mouse, Peregrine possible/No	Fill behind diked marsh	Yes, high restoration potential; existing marshes secure.
68.	South SF Bay	43,000	8.4 million use-days	California Clapper Rail, Black Rail, Salt Marsh harvest mouse/No	Fill behind diked marsh	Yes, high restoration potential outside present NWR boundary.

REGION: CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
69.	Princeton Marsh	30	70 ducks,March 1978. Low use	No/No	Development Airport	No, marginal in size. High waterfowl use not demonstrated.
70.	Tunitas Creek Estuary	11	125 ducks,March 1978. Low use	No/No	Low; Housing	No, too small; high waterfowl use not demonstrated
71.	San Gregorio Creek Estuary	6	11 ducks, March 1978	No/No	None	No, too small; high waterfowl use not demonstrated; included in State Beach.
72.	Pompanio Creek Estuary	1	2 ducks, March 1978	No/No	None	No, too small; no waterfowl use; State beach.
73.	Pescadero Marsh	250	Very high use	Peregrine possible/ Potential UE value	None	No, 30% on State Park CDPR acquisition proposal; apparently secure
74.	Lake Lucerne	80	Low value	No/No	Low	No, high waterfowl use not demonstrated;surrounded with orchard.
75.	Gazos Creek Estuary	2	March 1978 census revealed no value. Low use	No/No	None	No, too small, no waterfowl value.
76.	Cascade Creek Estuary	9	Low value	No/No	None	No, too small; low waterfowl value.
77.	Green Oaks Creek	31	Low value	No/No	None	No, marginal size; low waterfowl use;not natural habitat-reservoir.
78.	Waddell Creek Estuary	50	26 ducks, March 1978. Low use	No/Potential UE value	Low	No, waterfowl value not demonstrated.

REGION: CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
79.	Scott Creek	100	15 ducks, March 1978. Low use	No/No	Low	No, waterfowl value not demonstrated.
80.	Laguna Creek Estuary	25	No data available. Low use	No/No	Housing Highway	No, waterfowl value not demonstrated.
81.	Baldwin Creek Estuary	8	No data available	No/No	Housing	No, too small; waterfowl value demonstrated.
82.	Wilder Creek Estuary	8	10 ducks early March 1978. Low use	No/No	Housing	No, too small; waterfowl value not demonstrated.
83.	Terrace Point Pond	4	No data. Low use	No/No	Housing	No, too small; waterfowl value not demonstrated.
84.	San Lorenzo River Estuary	37	15 ducks, March 1978. Low use	No/No	Completely Urbanized; disturbance	No, waterfowl value not demonstrated.
85.	Wood's Lagoon	50	56 ducks, March 1978. Low use	No/No	Already lost to boat harbor	No, waterfowl value not demonstrated; completely urbanized-marina.
86.	Schwann's Lagoon	20	17 ducks, March 1978. Low use	No/No	Disturbance already lost to urbanization	No, too small; completely urbanize; State Beach; waterfowl value not demonstrated.
87.	Corcoran Lagoon	26	84 ducks, March 1978	No/No	Disturbance already lost to urbanization	No, marginal in size; waterfowl value not demonstrated; Organized surroundings.

REGION: CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
88.	Moran Lake	4	21 ducks, March 1978	No/No	Already lost to urbanization	No, too small; waterfowl value not demonstrated.
89.	Soquel Creek Estuary	6	27 ducks, March 1978. Low use	No/No	Already lost to urbanization	No, too small; waterfowl value not demonstrated.
90.	Aptos Creek Estuary	4	6 ducks, March 1978. Low use	No/No	Already lost to urbanization	No, too small; waterfowl value not demonstrated; urbanization.
91.	Pajaro River-Watsonville Slough	150	106 ducks 1978. Moderate use	Peregrine possible, Brown Pelican/ Potential UE value	Housing, but coastal commission effective	No, waterfowl value not demonstrated; State Beach protects some; coastal commission.
92.	McClusky Slough	150	No data available. Moderate use	No/Potential UE value	Fill for agriculture. Lack of water	Yes, possible conservation easement or fee acquisition, but value to waterfowl is not documented well.
93.	Elkhorn-Bennett Slough	2,500	Peak of 10,000 2400-3000 average population. High use	California Clapper Rail, Peregrine possible, Brown Pelican, Least Tern/Yes	Development	No, being acquired with LWCF; estuarine sanctuary.
94.	Moro Cojo Slough	150	No data available. High use in wet years.	No/No	Port Development	Yes, restoration potential.

REGION: CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
95.	Old Salinas River	50	No data available. Moderate use	Least Tern/Potential UE value	Port Development	Yes, restoration potential.
96.	Salinas River Estuary	300	No data available. Moderate use	Least Tern/Potential UE value	Harbor Development	No, already protected in NWR-WA.
97.	Trembladero Slough	10	Low use	No/No	None	No, too small; waterfowl value not demonstrated.
98.	Marina Ponds	5	Low use	No/No	Housing	No, too small; waterfowl value not demonstrated.
99.	Laguna Del Rey	40	No data available. Low use	No/No	Low	No, marginal size; surrounded by urbanization & freeway. Waterfowl value not demonstrated.
100.	Del Monte Lake	6	No data available. Low use	No/No	None	No, too small; waterfowl value not demonstrated; included in Navy post graduate school.
101.	El Estero Lake	15	No data available. Low use	No/No	Low	No, too small; waterfowl value not demonstrated; inlcuded in a city park.
102.	Carmel River Estuary	42	Low value	No/No	None	No, waterfowl value not demonstrated; included in State Beach.
103.	San Jose Creek Estuary	5	Low value	No/No	None	No, waterfowl value not demonstrated; included in State Beach.

REGION: CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
104.	Little Sur River Estuary	8	Low value	No/Potential UE value	None	No, waterfowl value not demonstrated; included in Sea Otter Refuge.
105.	Big Sur River Estuary	17	Low value	No/Potential UE value	None	No, waterfowl value not demonstrated; local & State interest in preservation.

REGION: SOUTH CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
106.	Arroyo de la Cruz	40	No data available. Low use	Least Tern, Brown Pelican/ Potential UE value	Orchards adjacent.	No, waterfowl value not established.
107.	Arroyo del Corral	40	No data available. Low use	Least tern, Brown Pelican/Potential UE value	Highway disturbance	No, waterfowl value not established.
108.	Arroyo [illegible]	3	No data available. Low use	Least tern/No	None	No, too small; waterfowl value not established.
109.	Little Pico Creek Mouth	3	No data available. Low use	Least Tern/No	None	No, too small; waterfowl value not demonstrated.
110.	Pico Creek Mouth	5	No data available. Low use	Least Tern/No	None	No, too small; waterfowl value not demonstrated.
111.	San Simeon Creek Estuary	40	No data available. Low use	Least Tern/No	Low	No, waterfowl value not established;included in State Beach.
112.	Santa Rosa Creek Estuary	40	No data available. Low use	Least Tern/ Potential UE value	None	No, waterfowl value not established;included in State Beach.
113.	Morro Bay	2,600	872,000 Brant use-days; 294,000 ducks use-days; extremely high use	Brown Pelican, Least Tern, Peregrine Falcon, California Clapper Rail, Morro Bay K-rat/Potential UE value	Harbor enlargement, pollution, disturbance mariculture	No, must secure via State Park, public trust, and proposed CDPR CDFG acquisitions.
114.	San Luis Obispo Creek Estuary	23	No data available. Low use	Brown Pelican, Least Tern/Potential UE value.	None	No, waterfowl value not demonstrated, marginal in size.

REGION: SOUTH CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
115.	Pismo Marsh	90	No data available. Moderate use	Least Tern/No	None	No, CDFG ER
116.	Oceano Lagoon	105	No data available. Low use	Least Tern/No	None	No, State Park.
117.	Dune Lakes	860	15,000 peak pop. 450,000 use-days plus; very high use	Least Tern, Black Rail/High UE value	Very Low	Yes, easement on duck clubs.
118.	Oso Flaco Lake	230	Shore birds Dune Lakes. Very high use	Least Tern/High UE value	Very low	Yes, easement on duck clubs.
119.	Santa Maria River Estuary	315	21,000 use-days (conservative) Low use.	Least Tern; Brown Pelican/Potential UE value	Development Oil exploration	No, unless possible to include with dune Lakes.
120.	Shuman Creek Mouth	2	No data available. Low use	Brown Pelican/No	None	No, too small; waterfowl value not demonstrated; Vandenberg AFB.
121.	San Antonio Creek Mouth	3	No data available	Brown Pelican, Least Tern/No	None	No, too small; waterfowl value not demonstrated;Vandenberg AFB.
122.	Santa-Ynez River Estuary	400	No data available. Moderate use	Least Tern, Brown Pelican/Potential UE value	Disturbance Space Shuttle	No, Vandenberg AFB & County park project.
123.	Canada Honda Creek Honda	1	No data available. Low use	Brown Pelican/No	None	No, too small; Vandenberg AFB

REGION: SOUTH CENTRAL COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
124.	Jalama Creek Mouth	2	No data available. Low use	Brown Pelican/No	None	No, too small; Vandenberg AFB
125.	Devereux Lagoon	45	No data available. Low use	No/No	Urbanization disturbance	No, urbanized; waterfowl value not demonstrated.
126.	Goleta Slough	360	150,000 use-days. Moderate use	Light Footed Clapper Rail, Least Tern, Belding Savannah Sparrow/No	None except airport disturbance	No, University of California Santa Barbara and City own marsh.
127.	Carpenteria Marsh	230	42,000 use-days Low use	Belding Savannah Sparrow, Least Tern/No	None	No, University of California owns one-half & negotiating for other half; well protected.
128.	Ventura River Mouth	10	No data available. Low use	Least Tern/No	None	No, waterfowl value not demonstrated; too small.
129.	Santa Clara River Mouth	60	No data available. Low use	Least Tern/No	Development of housing. Lack of water	No, waterfowl value not demonstrated; part of a flood way.
130.	McGrath Lake	40	No data available. Low use	Least Tern/No	None	No, marginal size; waterfowl value not demonstrated. Already protected on CDPR State park (McGrath Beach State Parks)
131.	Mugu Lagoon	2,355	314,000 use-days	Least Tern, Light Footed Clapper Rail/No	Minimal	Yes, conservation easements on duck clubs (620 acres) if a threat developes and preservation is determined to be desirable.

REGION: SOUTH COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
132.	Malibu Lagoon	7	None	No/No	Urbanization Pollution	No, no waterfowl value
133.	Ballona Creek Estuary	70	Very Low	No/No	Urbanization Pollution Disturbance	No, no waterfowl value.
134.	Anaheim Bay (Seal Beach)	1,000	784,000 use-days. High use	Light Footed Clapper Rail, Brown Pelican, Beld. Savannah Sparrow, Least Tern Peregrine Falcon/No	None	No, already a NWR - U.S. Navy.
135.	Bolsa Chica	1,100	2000 peak population. High use	Least Tern, Beld. Savannah Sparrow, Light Footed Clapper Rail/No	Oil development	Yes, high restoration potential.
136.	Santa Ana River Mouth	20	Very low, Little existing habitat	Least Tern/No	Oil development. Very high	Yes, possible restoration potential; about 200 acres.
137.	Upper Newport Bay	1,000	1.0 million use-days	Beld. Savannah Sparrow, Least Tern, Light Footed Clapper Rail/No	None	No, CDFG ER
138.	San Joaquin Marsh	150	No data available. Low use	No/No	Low	No, waterfowl value not demonstrated.

REGION: SAN DIEGO COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
139.	San Mateo Creek Estuary	20	200 counted Low use	No/No	Military Maneuvers	No, too small; waterfowl value not demonstrated; Camp Pendleton/ State Park
140.	Los Flores Creek Estuary	20	No data available. Low use	Least Tern/No	Military Maneuvers	No, too small; waterfowl value not demonstrated; Camp Pendleton manages.
141.	Santa Marguerita River Estuary	300	100,000 use-days. Moderate use	Brown Pelican,Least Tern, Belding Savannah Sparrow/No	Military Maneuvers	No, Camp Pendleton manages and protects.
142.	San Luis Rey River Estuary-Whelan Lake	160	5,800 use-days on San Luis Rey R;5,000 Canada geese. 4,000 ducks Whelan Lk	Least Tern/Potential UE value	Channelization & park Develop San Luis Rey	Yes, significant goose area on Whelan Lake ; potential restoration San Luis Rey River Corridor.
143.	Loma Alta Creek Estuary	15	No data available. Very low use	No/No	Already Urbanized	No, too small; waterfowl value not demonstrated.
144.	Buena Vista Lagoon	200	365,500 use-days. High use Shoveler/ Ruddies	Least Tern/No	None	No, CDFG ER
145.	Agua Hedionda Lagoon	340	100,000 use-days. Moderate use	Least Tern/High UE value	Harbor Development	No, CDFG proposing acquisition.
146.	Batiquitos Lagoon	600	550,000 use-days. High use	Least Tern/High UE value	Development	No, CDFG ER on part; proposing acquisition west & central portion; possible east side acquisition

REGION: SAN DIEGO COAST

NO.	AREA	ACRES	WATERFOWL VALUE	ENDANGERED SPECIES/ UNIQUE ECOSYSTEM (UE) VALUE	THREAT	MBCA PRESERVATION
147.	San Elijo Lagoon	570	400,000 use-days. High use	Least Tern, Black Rail/ High UE value	Housing	No, CDFG ER
148.	San Diequito Lagoon	150	120,000 use-days. Moderate use	Least Tern/Potential UE value with restoration	Race track Marina, Industrial Park Housing	No, CDFG ER proposed; High restoration potential.
149.	Los Penasquitos Lagoon	400	215,000 use-days High use	Least Tern, Light Footed Clapper Rail, Belding Savannah Sparrow/No	Housing Power Plant, Flood control. Poor tidal flush	No, CDPR owns one-half, proposing acquisiiton of other half.
150.	Mission Bay	1,720	300,000 use-days. High use	Least Tern/No	Boating disturbance Urbanized	No, waterfowl marsh lost to urban development; birds use open water.
151.	San Diego River & Flood Channel	320	No data available. Brant have used. Low use	Least Tern/No	None	No, permanent flood way & protected.
152.	South San Diego Bay	2,400	2.7 million use-days. Very high use	Least Tern, Light Footed Clapper Rail, Belding Savannah Sparrow/ Potential UE value	Port Dist. New entrance to Bay; Disturbance Boating	No, proposed acquisition with LWCF; In 1984, CDFG will get Bay Lands from State Land Division
153.	Tijuana Slough	1,100	28,110 use-days. Low use	Least Tern, Black Rail, Light Footed Clapper Rail	Highways; flood control, housing fill; marina	No, propsoed LWCF 400 acre acquisition; Navy and State Park owns remainder.

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