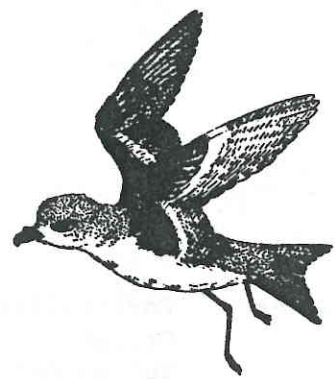


Bird Species of Special Concern in California



Prepared by

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for

**California Department of
Fish and Game**

Cover: Fork-tailed Storm-Petrel
Osprey
Tufted Puffin

Page 13: Spotted Owl

Page 27: Purple Martin

Art Work by Narca Moore-Craig

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To Whom It May Concern:

Bird Species of Special Concern in California has been prepared to help land management agencies, developers, landowners and the general public take action to protect declining bird populations before they become endangered. A species of special concern has no special legal status, thus there is no special requirement, such as the law provides for endangered species, to consider potential adverse impacts of a project upon the species and its habitat. Yet by giving special consideration to species of special concern whenever possible, we can avoid the costly recovery efforts that might otherwise be required to save the species.

Additional information has been gathered on a number of species since this report was prepared. Field surveys of three birds originally on the special concern list, Elf Owl, Great Gray Owl and Least Bell's Vireo, have led to their listing by the Fish and Game Commission as endangered species, and hence to their removal from this report. Our Nongame Wildlife Investigations section solicits your help in compiling range and abundance data needed to prepare periodic revised editions of this report. Please send observations to Nongame Wildlife, Department of Fish and Game, 1416 Ninth Street, Sacramento, CA 95814.

Bird Species of Special Concern in California was prepared by Mr. J. V. Remsen for the Western Field Ornithologists, Inc. under contract with the Department of Fish and Game. Mr. Remsen received assistance and information from many active field ornithologists in the state, largely as a volunteer effort. On behalf of the Department of Fish and Game, I want to thank all who provided information and participated in this fine document.

Sincerely,

EC Fullerton
Director

State of California

THE RESOURCES AGENCY

Department of Fish and Game

BIRD SPECIES OF SPECIAL CONCERN IN CALIFORNIA

AN ANNOTATED LIST OF DECLINING

OR VULNERABLE BIRD SPECIES

by

J. V. Remsen, Jr.

Western Field Ornithologists, Inc.

ABSTRACT

Information on status and range, causes of decline, potential threats and management needs is presented for 61 bird species of special concern in California. Species included are those whose breeding populations in the State have declined severely or are otherwise so low that extirpation is a real possibility. Species already on federal or California endangered, rare or threatened species lists, and species that have nested only casually in California, are excluded from the list. Species are grouped in three categories to provide guidance in setting priorities for expenditure of nongame research funds, acquisition of habitat, and other management actions.

Supported by Federal Aid in Wildlife Restoration, Project PR W_54_R_9, Nongame Wildlife Investigations, Wildlife Management Branch Administrative Report No. 78_1 (June 1978).

RECOMMENDATIONS

In addition to specific recommendations contained in the species accounts,

Western Field Ornithologists and the California Department of Fish and Game recommended the following:

1. Give high priority to the following wildlife needs for habitat:
 - a. Protect and restore riparian woodland throughout the state, but especially along the Colorado River and in the San Joaquin Valley. There is a particularly critical need to preserve riparian mesquite woodland.
 - b. Maintain and restore permanent (as opposed to seasonal) fresh water marsh, especially in the lower San Joaquin Valley and along the central and southern California Coast.
 - c. Create and maintain nesting islands for colonial waterbirds wherever feasible, but particularly at the Salton Sea, Hartson Reservoir, and Eagle Lake (Lassen Co.), at Mono Lake, and in the Klamath Basin.
2. Initiate a cowbird control program to determine feasibility and effectiveness in restoring host populations to non-threatened status.
3. Determine the impact of starlings on cavity nesting species.
4. Propose species of special concern that meet the criteria of endangered, rare, or threatened species to the California Fish and Game Commission and the U. S. Fish and Wildlife Service for inclusion on the appropriate lists.
5. State and federal wildlife agencies, land management agencies and educational institutions give high priority to programs involving species on this list when budgeting research and management funds.
6. Maintain restrictions on use of persistent pesticides in California and encourage Governments elsewhere in the world to halt the use of DDT and other chlorinated hydrocarbon pesticides.
7. Update the species of special concern list every two years to reflect new information concerning status, distribution and management needs.

INTRODUCTION

The following is a list of bird species whose California breeding populations (in most cases) are of special concern in that they may face extirpation. The danger may be immediate and the situation critical, or it may be rather remote but still a real possibility. The list is intended for use as a management tool. These species should be taken into special consideration when decisions are made concerning the future of any land parcel and when budgeting research and management funds.

The primary emphasis is on the status of the breeding population within California. A species may migrate through or winter in California in substantial numbers, showing no signs of decline, but if the breeding population within the state has shown a severe decline, or is in a vulnerable situation, the species warrants inclusion on the special concern list (e.g., Common Loon, Marsh Hawk, Yellow Warbler). There are also species, abundant just outside California, whose worldwide population faces no threat, but whose population within California is so low that it is potentially vulnerable to extirpation (e.g., Vermilion Flycatcher, Black-capped Chickadee, Virginia's Warbler, Summer Tanager, Gray-headed Junco, etc.). The philosophy here is that the California breeding population

is the primary concern, and the goal is to maintain diversity within ecosystems in California, regardless of a species' status elsewhere.

Some species on the special concern list at the extremes of their geographical distribution in California may be decreasing due to long-term climatic changes and thus may be on their way to vanishing from California regardless of conservation efforts. Yet, it is very difficult to determine if climatic change is the factor responsible for the decline, and the decline should not be accelerated by human activities, especially since climatic changes are often not unidirectional but may reverse direction at unpredictable times. Therefore, a number of marginal species are included in the list.

Excluded from the list are the following: (1) those birds already on Federal and/or California endangered, threatened, or rare lists (i.e., California Brown Pelican, Aleutian Canada Goose, California Condor, Bald Eagle, American Peregrine Falcon, California Clapper Rail, Light-footed Clapper Rail, Yuma Clapper Rail, Black Rail, California Least Tern, California Yellow-billed Cuckoo, Elf Owl, Great Gray Owl, San Clemente Loggerhead Shrike, Least Bell's Vireo, Inyo Brown Towhee, Belding's Savannah Sparrow, San Clemente Sage Sparrow); (2) those species historically much more common than at present but whose current population levels are probably stable and high enough that extirpation is not a concern (e.g., several species of herons, geese, ducks, and shorebirds); (3) those species that may have very small total ranges or populations in California but that are primarily associated with man-made habitats (i.e., Inca Dove, Great-tailed Grackle, Bronzed Cowbird); (4) those species for which breeding in California must be regarded as an unusual event until consistent breeding is proven (e.g., Least Grebe, Canvasback, Hooded Merganser, Royal Tern, Chimney Swift, Eastern Kingbird, Northern Parula, American Redstart, Painted Redstart, Pyrrhuloxia). The list deals with subspecies only if they are highly threatened and warrant placement on the Highest Priority List.

LIST CATEGORIES

The species of special concern list is divided into three categories: Highest, Second, and Third priorities. These categories are defined on the basis of the urgency of the situation. Species in the Highest Priority category face immediate extirpation of their entire California population or their California breeding population if current trends continue. In several cases, extirpation as breeding species has already occurred. Species in the Second Priority category are definitely on the decline in a large portion of their range in California, but their populations are still sufficiently substantial that danger is not immediate. Species in the Third Priority category are not in any present danger of extirpation and their populations within most of their range do not appear to be declining seriously; however, simply by virtue of their small populations in California, they are vulnerable to extirpation should a threat materialize.

Other species that were considered for inclusion on the Special Concern List are listed at the end of the species accounts given below. Further study is needed to determine the status of many of these species. Categorization of species is done regardless of land ownership status of important areas within the range; in many cases, a bird's presence in a "protected area" does not guarantee its well-being, as public lands frequently are managed primarily for human uses that conflict with the needs of wildlife.

SPECIES ACCOUNTS

The content of the species accounts is based upon (1) personal communications with many of the most active field observers in California and (2) a thorough, but by no means complete, literature search concentrating on three journals, Condor, Western Birds (formerly California Birds), and the nesting season reports in American Birds (formerly Audubon Field Notes). The cutoff time for inclusion of observations in the species accounts is the end of the 1977 nesting season.

For each species on the list, the following information is given:

Status and Range

A summary of historical and current distribution and population status within California is given in a very general way. Detailed discussion of distribution and status is beyond the scope of this report.

Reasons for the decline

The reasons for the population decline are discussed. In most cases the exact reasons are not well-known or well-documented, and so the reasons given are mainly "best guesses" or speculation rather than established facts. For Third Priority species, this section is entitled Potential Threats, since in most cases no serious decline is apparent.

Recommendations

Suggestions for maintaining or improving population levels are given. Increasing our knowledge of the biology of the species on the list is not mentioned as a recommendation under each species, although this should be encouraged for every species on the list.

CALIFORNIA DEPARTMENT OF FISH AND GAME

BIRD SPECIES OF SPECIAL CONCERN LIST

HIGHEST PRIORITY	THIRD PRIORITY (28 SPECIES)
Common Loon	Black Storm-Petrel
*White Pelican	Ashy Storm-Petrel
*White-faced Ibis	Least Bittern
*Fulvous Whistling-Duck	Barrow's Goldeneye
*Swainson's Hawk	Harlequin Duck
*Harris' Hawk	Goshawk
*Merlin	*Sharp-shinned Hawk
Sharp-tailed Grouse	*Cooper's Hawk
Yellow Rail	Golden Eagle
Laughing Gull	*Prairie Falcon
Gilded Common Flicker	Ruffed Grouse
Willow Flycatcher	*Sage Grouse
Vermilion Flycatcher	Sandhill Crane
Arizona Bell's Vireo	California Gull
	Elegant Tern
SECOND PRIORITY (19 species)	Black- Skimmer
	Marbled Marrelet
Fork-tailed Storm-Petrel	Rhinoceros Auklet
*Double-crested Cormorant	Black Swift
*Marsh Hawk	Wied's Crested Flycatcher
*Osprey	Black-capped Chickadee
*Snowy Plover	Bendire's Thrasher
*Gull-billed Tern	Le Conte's Thrasher
Tufted Puffin	Crissal Thrasher

*Burrowing Owl	Virginia's Warbler
Spotted Owl	Hepatic-Tanager
Long-eared Owl	Cardinal
*Short-eared Owl	Gray-headed Junco
Gila Woodpecker	Bank Swallow
*Purple Martin	Black-tailed Gnatcatcher
Gray Vireo	*Yellow Warbler
*Yellow-breasted Chat	
Summer Tanager	

HIGHEST PRIORITY LIST

COMMON LOON (Gavia immer)

Status and range: This species formerly bred on lakes above 5000 ft. in Shasta and Lassen counties; specific localities given in Grinnell and Miller (1944) are Snaggy Lake, Butte Lake, and Eagle Lake. This region was very poorly known at that time, so the actual number of breeding birds was almost certainly much greater. Today this species may no longer breed in California. The only recent report of possible breeding was of a pair at Twin Lakes, Mono Co. (Stalleup and Greenberg 1974b), but this area is too heavily used by humans to support successful breeding (T. Heindel, pers. comm.).

Reasons for the decline: Human disturbance at breeding sites, especially by boats, is the most likely reason for the decline. Ream (1976) found disturbance from canoeists to be the prime factor in the decline of a Minnesota population of Common Loons; the mere presence of canoes on breeding lakes keeps incubating birds away from nests, causing them either to desert entirely or leave the nest unguarded and more susceptible to predation.

Recommendations: (1) Survey lakes in former breeding range to look for breeding pairs, which are loud and conspicuous, requiring a minimum effort to be detected.

This survey could be combined with a survey for breeding Barrow's Goldeneyes, another Highest Priority species. Care must be taken to distinguish breeding birds from late spring migrants or nonbreeding summering birds (often in nonbreeding plumage, seldom consistently vocal or persistently associating in pairs). (2) Close to boating during spring migration and breeding season any lake found to contain breeding pairs.

WHITE PELICAN (Pelecanus erythrorhynchos)

Status and range: At the turn of the century, this species nested on large lakes the entire length of California, but a decline was already underway in the 1920's both in numbers of breeding localities and populations within surviving colonies (Grinnell and Miller 1944). Today there are no remaining nesting colonies in California except along the Oregon border. No nesting has been recorded for many decades at former nesting colonies such as the Salton Sea (last nesting attempts in the late 1950's; Small 1956, 1957, 1959a), Tulare Lake, Buena Vista Lake, lower Sacramento Valley, and Eagle Lake. A large colony nested successfully in summer 1976 at Hartson Reservoir, Lassen Co., where they had not nested in at least a decade, but with reduced water levels in 1977, none returned to nest (A. Lapp, pers. comm.; Winter and Erickson 1976; ABF; Winter and Morlan 1977; Tait et al. 1978). Although thought to have disappeared from California as a breeding species (Small 1974), there is a population of 1700-6000 birds breeding in the

Klamath Basin refuges, with Clear Lake National Wildlife Refuge supporting the majority (D. Winkler, pers. comm.). There are approximately 15 colonies of this species still in existence in the world with a total combined population of about 34,000 (Sloan 1973, Lies and Behle 1966).

Reasons for the decline: Destruction of nesting islands and breeding habitat are probably the main reasons, although direct disturbance by humans may have contributed. At the Salton Sea, former nesting islands are now inundated by rising water levels, although much suitable feeding habitat still exists. At Tulare and Buena Vista lakes, the entire breeding habitat was destroyed when the lakes were drained. The possibility of pesticide contamination should also be monitored, although DDE levels in Utah pelican populations have not yet reached levels sufficient to effect reproductive success (Knopf and Street 1974).

Recommendations: (1) Maintain habitat integrity and water levels at breeding localities on the Klamath Basin refuges. (2) Manage Hartson Reservoir, Lassen Co., as a breeding sanctuary for White Pelicans and Double-crested Cormorants by maintaining water levels in the reservoir and eliminating human disturbance during breeding season. (3) Create artificial nesting islands at former breeding localities at Salton Sea and Eagle Lake to encourage recolonization. These areas often support nonbreeding, summering populations, possibly pre-breeding age young, which may nest if sites are available. (4) Monitor population trends and reproductive success at existing colonies.

WHITE-FACED IBIS (Plegadis chihi)

Status and range: This species was once a locally common breeder the length of California. The center of abundance was in the San Joaquin Valley, but numbers also bred in northeastern California and the southern coastal area (Grinnell and Miller 1944). At least 200 nests were found in one marsh at San Jacinto Lake, Riverside Co. (Willett and Jay 1911) and a small breeding population was present in San Diego Co. (Sharp 1907). Now it is not known to breed regularly anywhere in California. As many as 20 birds often summer at Honey Lake Wildlife Area and are suspected of breeding (T. Manolis, pers. comm.), but no breeding was noted in 1977 (A. Lapp, pers. comm.). The last known breeding at Tule Lake occurred in 1965 (10 pairs; Ryder 1967). In 1977, 3-4 pairs bred at the Wister Unit of Imperial Wildlife Area at the Salton Sea, where no nesting has been recorded for nearly two decades (McCaskie 1977b; Ryder 1967; McCaskie 1966, 1968, 1969, 1970). The last known nesting attempt by any substantial numbers of ibis was in 1960 (100 pairs at the mouth of the Alamo River; Small 1960); as many as 1500 birds were reported in the summer at the Salton Sea as recently as 1962 (Small 1962), whereas only a few dozen birds have been reported in recent years (McCaskie 1974b, 1975c). The Los Banos area in Merced Co., once the stronghold of this species in California, no longer supports any breeding birds (J. Cawthon and L. Littlefield, pers. comms.). Thus, there has been a drastic decline in the numbers of this species in California, a trend already apparent by the 1940's (Grinnell and Miller 1944).

The wintering population of ibis in California is also declining. The southern coastal population in particular has been greatly depleted, especially in Orange Co. In the winter of 1976-77, fewer than 200 birds were reported in California, and these were all from just three localities; Los Banos Wildlife Area, Merced Co. (60, Winter and Erickson 1977; as many as 190 wintered here 5 years ago); Imperial Valley (100+, McCaskie 1977); and near Oceanside, San Diego Co. (35, McCaskie 1977). A small population has recently been discovered wintering at the Point Mugu Gun Club, Ventura Co. (25, P. Lehman, pers. comm.).

Reasons for the decline: Destruction of marsh habitat, especially along the southern coast and in the San Joaquin Valley, is perhaps the main factor responsible for the decline. This species prefers shallow, grassy marshes, and this type of wetland has disappeared from most of California. Furthermore, many wetlands are allowed to go dry during spring and summer for mosquito and cattail control. Perhaps DDE contamination and resultant eggshell thinning is also involved; the Bear River, Utah, population experienced disastrous eggshell thinning in the late 1960's (L. Kiff, pers. comm.), and there is reason to suspect that California populations were also contaminated. This species has vanished from remaining suitable breeding habitat in California, implying that factors other than habitat destruction are involved.

Recommendations: (1) In key areas, especially Honey Lake, Los Banos, and Imperial Wildlife areas and San Luis National Wildlife Refuge, allow some areas to remain wet and become overgrown with marsh vegetation. Shallow flooding of additional grassy areas will greatly benefit this species and other Special Concern species such as Fulvous Whistling Duck, Marsh Hawk, Least Bittern, Short-eared Owl, Sandhill Crane, and breeding waterbirds in general. (2) Acquire the San Jacinto Lakebed as a State Wildlife Area and restore breeding habitat for this species. As noted above, this area was once an important breeding area for White-faced Ibis.

FULVOUS WHISTLING-DUCK (*Dendrocygna bicolor*)

Status and range: This species formerly nested in the southern coastal area (Willet 1912), the San Joaquin Valley, and occasionally around the southern end of San Francisco Bay (Grinnell and Miller 1944). It is now completely extirpated from the southern coastal area and San Francisco Bay areas, and may also be gone from the San Joaquin Valley. Perhaps gone forever is the situation described by Tyler (1913): "...a mile or so above Dos Palos, these birds were really abundant, every little pond having two or three individuals and sometimes several little groups..."

In 1977, not a single bird was reported from this area of the San Joaquin Valley; the refuges in the area no longer have any nesting pairs (J. Cawthon, pers. comm.; L. Littlefield, pers. comm.; R. B. Reno, pers. comm.).

This species now breeds only in the Imperial Valley, but numbers are highly variable from year to year, and breeding is not reported to occur in some years (McCaskie 1975c). The breeding population has apparently declined, since observations of broods were much more frequent two decades ago (Pyle 1951, Small 1956) despite much more thorough coverage in recent years.

Reasons for the decline: Destruction of marsh habitat has probably been the main cause for the decline. However, there are areas of apparently suitable habitat remaining which lack Fulvous Whistling-Ducks, so other factors may be involved.

Recommendations: (1) Maintain habitat integrity in critical areas of the Imperial Valley such as Finney Lake, Ramer Lake and Wister Unit, Imperial Wildlife Area, and Unit 1 of Salton Sea National Wildlife Refuge, Imperial Co. (2) Manage wetlands in San Joaquin Valley so that marshes do not dry completely during spring and summer months (see White-faced Ibis). (3) Consider giving this species full protection from hunting. Although the bulk of the population migrates into Mexico before hunting season opens, hunters should be made aware of the critical status of this species in California.

SWAINSON'S HAWK (*Buteo swainsoni*)

Status and range: The Swainson's Hawk was once an abundant breeding bird in California. It nested commonly throughout the nonforested lowlands from northeastern California south along the eastern edge of the Sierra Nevada to the Owens Valley, throughout the Sacramento and San Joaquin valleys, and along the southern coast from Ventura Co. to San Diego Co. (Grinnell and Miller 1944). Populations were also breeding in the Salinas Valley, the Santa Clara Valley, and some of the larger mountain meadows. Even by 1944, Grinnell and Miller reported that populations were greatly reduced, and this reduction has continued through the present until now the species is a scarce breeding bird in California, having suffered the most severe decline of any bird in the State except for the Bell's Vireo.

The coastal southern California population has been extirpated; no reports of breeding birds have been received in decades. The Salinas Valley and Santa Clara Valley populations have also disappeared. Very few birds have been reported from northeastern California in recent years, and most of the reports pertain to migrants (ABF). Only a few pairs remain in the San Joaquin Valley, and most of these are from Merced Co. north. It is extremely rare in the southern San Joaquin Valley. A nest at Mendota Pool in summer 1977 was one of the few located in recent years in Fresno Co. (R. Hansen, pers. comm.). The few pairs in the Cima Dome area, San Bernardino Co., at this species' southeastern limit in California (Johnson, Bryant, and Miller 1948), have disappeared in the last three years (Remsen, Cardiff, and Cardiff, MS). The largest known population remaining in the state is located in the Davis-Woodland-Sacramento area of the Sacramento Valley where five to six nests have been reported per summer in the last few years (ABF). Smaller

numbers have been reported north into Glenn and Butte Co. At least five pairs were present in the Chico area in 1977 (S. Laymon, pers. comm.).

Paralleling the decline in breeding birds, reports of migrants have diminished greatly in recent decades. The last report of a flock of over 100 birds (formerly a regular occurrence) in northern California was in 1968 (ABF), despite more thorough coverage of the Central Valley in the last ten years. In southern California, flocks of 100-600 were reported regularly as late as the early 1950's, but groups of ten or more have been reported only rarely since then (J. Dunn, pers. comm.). For example, 470 were counted at the southeastern edge of the San Gabriel Mountains on 3 April 1951, 520 the next day, and 51 three days later (Small and Pyle 1951); in the Imperial Valley, 62 were counted on 29 October 1951 (Small and Pyle 1952) where even single birds are rarely found now. In the Santa Barbara region, this species used to be a fairly regular migrant, but now an average of less than one bird per year is reported (P. Lehman, pers. comm.) despite much more thorough coverage. At Escondido in San Diego Co., where once a "not uncommon" breeding bird, occasionally "great flocks" were seen in migration (Sharpe 1907). Now this species is seldom reported from coastal San Diego Co.

Reasons for the decline: Conversion of the Central Valley and other grassland areas from pastureland to cropland has probably been a major factor in the population decline. However, other unknown factors such as possible pesticide contamination and habitat deterioration on the South American wintering grounds may be more important. Human disturbance at nest sites and shooting have also contributed to the decline in numbers of this species.

Recommendations: (1) Protect existing pastureland and grassland in the Central Valley and manage to maximize suitability for this species. (2) Inform farmers of the highly beneficial value of this species to insure protection of nest sites. (3) Monitor productivity of remaining nesting pairs, but avoid disturbance to nesting birds.

HARRIS' HAWK (*Parabuteo unicinctus*)

Status and range: The Harris' Hawk no longer breeds in California. This species was formerly a locally common permanent resident in the lower Colorado River Valley, north to Blythe, as well as in the Imperial Valley (Grinnell and Miller 1944, Small 1974). There have been virtually no reports from the Colorado River in the last 15 years. The last unquestionable record was of a bird north of Blythe in November 1964 (Snider 1965). It is virtually certain that no breeding birds remain. From Audubon Field Notes, it appears there was a sudden drop-off in bird populations in the Colorado River Valley beginning in about 1959 (J. Dunn, pers. comm.). This species is gone from the Imperial Valley, where no nests have been reported in 25 years, except for an unsuccessful attempt by a pair released at Wister, Imperial Wildlife Area, Imperial Co., after being confiscated from falconers (McCaskie 1976b). All recent reports from California are regarded as birds which have escaped from or been released by falconers.

Reasons for the decline: Falconry has almost certainly played a major role in the decline of the Harris' Hawk, which is highly coveted by falconers. A falconer once told this writer that after they had completely depleted Colorado River populations, falconers made trips to Arizona, Texas and even Mexico to obtain birds, and would smuggle them illegally into California and register them with the Department of Fish and Game as having been taken in California. Although habitat destruction along the Colorado River and Imperial Valley has been extensive and has certainly been a factor in the decline, the Harris' Hawk does not require extensive riparian woodland, and presumably small populations could nest in remaining brushlands adjacent to agricultural areas.

Although pesticide residues have been found in Harris' Hawks eggs in Arizona, they have not reached levels high enough to affect reproductive success (Mader 1977).

Recommendations: (1) Reintroduce Harris' Hawks produced by captive raptor breeding projects, as well as any confiscated or rehabilitated birds that are releasable, into suitable breeding habitat in the Colorado River and Imperial valleys. These birds should be banded for easy field recognition so that released birds can be distinguished from truly wild individuals for population monitoring. (2) Protect and restore mesquite brushland adjacent to riparian areas in the Colorado River and Imperial valleys. (3) Review regulations, and procedures governing importation of this species from outside California. Prohibit importation unless the documentation obtained by the importer from the state or country granting the export permit is adequate to ensure that "imported" birds are not actually taken illegally in California.

MERLIN (*Falco columbarius*)

Status and range: The Merlin is the only species on the Special Concern List which is not known to breed in California. This species used to be a fairly common to common winter visitant and migrant in California (Willett 1912, Grinnell and Miller 1944), but has declined drastically in the last two decades. The total number of winter reports in recent years has dropped to only six to ten birds in southern California (McCaskie 1973c, 1974c, 1975b, 1976c, 1977a) and 20-30 in northern California (Stallcup and Winter 1975b; Stallcup and Winter 1976b); extremely low totals in comparison to those of earlier years. The Merlin occurs as a transient throughout most of California, but wintering birds are concentrated along the coast and in the Central Valley (ABF).

Populations throughout the United States and Canada have declined drastically, paralleling the decline of the Peregrine Falcon. This species may be a candidate for the Federal endangered species list, in light of the similarity in trends between the Merlin and the Peregrine Falcon and the recent findings concerning massive reproductive failure of Merlins in Canada (Fox 1971).

Reasons for the decline: Reproductive failure due to DDE contamination has been shown to be widespread in populations of the subspecies *richardsonii* in central Canada (Fox

1971). Legal take of juveniles from the wild is taking those birds potentially able to reproduce successfully in the wild in the pesticide era.

Recommendations: (1) Maintain restrictions on use of persistent pesticides in United States. (2) Encourage federal government to work through diplomatic channels to seek ban on persistent pesticide use on wintering areas in Central and South America. (3) Conduct survey to determine current status of this species in California and consider moratorium on take for falconry pending determination of status.

SHARP-TAILED GROUSE (*Pedioecetes phasianellus*)

Status and range: The Sharp-tailed Grouse has been extirpated from California. According to Grinnell and Miller (1944), this species was a resident in Modoc Co. southwest into northwestern Lassen Co. and Shasta Co., abundant up to about 1880, but rapidly declining thereafter. There have been no reports of birds since about 1915.

Reasons for the decline: Destruction of grassland habitat in northeastern California by agriculture and overgrazing combined with possible over-hunting were probably the main factors leading to the disappearance of this species.

Recommendations: (1) Consult with a game-bird specialist familiar with the requirements of this species and survey northeastern California to determine if suitable habitat still exists. (2) If suitable habitat is available or can be restored, reintroduce the subspecies *P. p. columbianus* to suitable areas within its former range in California.

YELLOW RAIL (*Coturnicops noveboracensis*)

Status and range: The Yellow Rail perhaps no longer breeds in California. Small numbers bred in grassy meadows in Mono Co., and probably in Plumas Co. and along the eastern edge of the Sierra Nevada (Grinnell and Miller 1944). This species is so difficult to detect that it was almost certainly more widespread than historical records indicate, and some may still persist in California, although recent thorough searches of some former breeding localities have not been successful (Stallcup and Winter 1975c; T. Heindel, pers. coun.). Prior to 1944, winter records of 35 individuals were obtained from 16 localities along the coast from Humboldt Co. to Orange Co. and inland in Merced Co. and Riverside Co. (Grinnell and Miller 1944). This is an impressive number of records for this extremely secretive species, indicating a substantial wintering population. Since 1944, however, very few records have been obtained.

Reasons for the decline: Grazing of the wet grassy meadows may be the primary reason for the decline of the breeding population (Stallcup and Winter 1975c). Ungrazed meadows in the former breeding range are almost nonexistent (T. Heindel, pers. comm.;

D. Gaines, pers. comm.). Although coastal marshes and inland marshes have greatly declined, there is still suitable habitat. The decline of the wintering population may be related to the decline on the breeding grounds.

Recommendations: (1) Using tape-recorded calls, survey former breeding sites in Mono County (Bridgeport Valley and Long Valley) and other similar localities along the eastern edge of the Sierra Nevada during the nesting season. (2) If Yellow Rails are found, maintain these sites free from grazing and human disturbance. (3) Maintain habitat integrity of coastal marshes, especially those around San Francisco Bay, which were apparently major wintering areas.

LAUGHING GULL (*Larus atricilla*)

Status and range: Once a regular nester at the Salton Sea, the Laughing Gull has now disappeared from California as a breeding species. Although the data are incomplete, it appears that this species nested annually at the south end of the Salton Sea until at least 1957 (Pyle 1951; Small 1952, 1956, 1957), and possibly intermittently until 1965 (J. Dunn, pers. comm.).

Reasons for the decline: Loss of nesting habitat by the rising water level of the Salton Sea has probably been the major reason for the decline.

Recommendations: (1) Restore Laughing Gull nesting habitat at the Salton Sea. (2) Maintain habitat integrity of marshes at the Salton Sea.

GILDED COMMON FLICKER (*Colaptes auratus mearnsi*)

Status and range: This race of the Common Flicker, formerly considered a separate species, once was fairly common along the Colorado River Valley in California between Needles and the Mexican border, especially in saguaro cactus groves (Grinnell and Miller 1944; Grinnell 1914). A small population was also found in the Joshua Tree Woodland of Cima Dome, San Bernardino Co. (Johnson, Bryant, and Miller 1948; McCaskie 1973a). Today this form is very rarely reported along the Colorado River and may have vanished as a breeding bird. The Bill Williams River Delta on the Arizona side may be the only locality where this species still nests in the Colorado River Valley (D. Gaines, pers. comm.). The Cima Dome population is down to one or two pairs and is in danger of genetic swamping from hybridization with the Red-shafted form (Remsen, Cardiff, and Cardiff, MS).

Reasons for the decline: Destruction of riparian woodland and saguaros in the Colorado River Valley is undoubtedly the main reason for the decline. Perhaps nest site competition with Starlings is also a factor. Overgrazing on Cima Dome may be partly

responsible for the decline in that area, although hybridization with invading Red-shafted types is currently the major threat.

Recommendations: (1) Protect existing riparian habitat and saguaros along the Colorado River. (2) Acquire land suitable for restoration of cottonwood riparian habitat along the Colorado River. Cottonwoods and willows are easily planted and fast growing, and perhaps suitable habitat could be restored in a relatively short time. Considering the number of Special Concern species that would benefit from such habitat restoration and the scarcity of riparian vegetation along the Colorado River, this type of project would benefit the following: Elf Owl, Bell's Vireo, Yellow Warbler, Yellow-breasted Chat, Summer Tanager, Wied's Crested Flycatcher, Gila Wood-pecker, Cooper's Hawk, and to some extent Harris' Hawk, Vermilion Flycatcher, and Crissal Thrasher. (3) Maintain habitat integrity of Joshua Tree Woodland of Cima Dome, the largest stand of Joshua trees in the world. (4) Determine impact of nest site competition with Starlings in Colorado River Valley.

WILLOW FLYCATCHER (*Empidonax traillii*)

Status and range: Once a breeding bird throughout much of California, common in suitable habitat (Grinnell and Miller 1944), this species has undergone a drastic population decline in recent decades and has been extirpated from most of its range, surviving only in the Sierra. This species was formerly locally common in riparian woodlands of the Central Valley. Goldman (1908) found it to be "rather common" in willow thickets along the Kings River in the southern San Joaquin Valley and Linton (1908) called it a common breeder in the vicinity of Buena Vista Lake. Today it has apparently been extirpated from all known localities in the Central Valley (D. Gaines, pers. comm.; R. Hansen, pers. comm.). This species is no longer known to breed in the southern coastal area (McCaskie 1975c; J. Dunn, pers. comm.) where it was once a common summer resident (Willett 1912). Populations along the central coast, never high to begin with, are now extremely low or nonexistent. Barlow (1900) found this species "breeding commonly along the creeks flowing into San Francisco Bay" where today it is unknown as a breeding bird. Even populations in the Sierra have shown dramatic declines. Gaines (1977) states this species has nearly vanished from Yosemite Valley and is alarmingly scarce elsewhere in the Yosemite region.

Reasons for the decline: Although destruction of willow riparian woodland has undoubtedly played a role in the decline of this species (Stallcup and Winter 1975a), the absence of the Willow Flycatcher from remaining suitable habitat plus their decline in the Sierra Nevada where habitat is still intact, indicates something else is amiss. Cowbird parasitism, convincingly implicated in the decline of Bell's Vireo and Yellow Warbler, is almost certainly involved (Gaines 1974, 1977).

Recommendations: (1) Initiate cowbird removal programs on an experimental basis in selected riparian areas to determine if cowbirds can be controlled on a local level (see

Bell's Vireo below). (2) Protect willow riparian woodland throughout California, especially in the Sacramento and San Joaquin valleys, and along the southern California coast. The Carmel River mouth, one of the only areas on the central coast where breeding has been reported in recent years (Stallcup and Greenberg 1974b), should also receive special attention.

VERMILION FLYCATCHER (*Pyrocephalus rubinus*)

Status and range: Formerly fairly common the entire length of the Colorado River in California and also in the Imperial and Coachella valleys (Grinnell and Miller 1944, Hollister 1908, Grinnell 1914), this species has now disappeared as a breeding bird from most of its breeding range. A few pairs may still breed along the Colorado River, although none were observed anywhere on the California side in surveys of the area in 1977 (D. Gaines, pers. comm.). A decline in the population had already been noted by the 1950's (Monson 1950, 1958, 1959). This species apparently no longer nests in the Coachella Valley or Imperial Valley (J. Dunn, pers. comm.). A population present in the San Diego area primarily in the 1950's has since disappeared. The last nesting reports were in 1969 (McCaskie 1969), although as many as 24 young were fledged at a single locality in 1960 (Small 1960). At present, there are only three localities with breeding populations: Morongo Valley, San Bernardino Co., where the small population has declined to but a single pair (McCaskie 1974b); Mojave Narrows Regional Park, San Bernardino Co. (D. Gaines, pers. comm.); and near Castaic along the Santa Clara River, Los Angeles Co. (McCaskie 1970; R. Webster fide J. Dunn). Current status of the latter population is unknown.

Reasons for the decline: A significant factor in the decline may be the destruction of cottonwood riparian woodland and groves in most of its range. In the Coachella and imperial valleys, destruction of artesian oases when the water table was lowered has played a significant role (E. A. Cardiff, pers. comm.). Cowbird parasitism may also be involved.

Recommendations: (1) Protect cottonwood riparian woodland along the Colorado River, especially where adjacent to pastures or alfalfa fields. (2) Protect cottonwood groves and oases in the Coachella and Imperial valleys. (3) Acquire land suitable for restoration of riparian woodland along the Colorado River (see Gilded Flicker above). (4) Maintain habitat integrity at Morongo Valley and Mojave Narrows Regional Park. (5) Survey Santa Clara River near Castaic for Vermilion Flycatchers.

ARIZONA BELL'S VIREO (*Vireo bellii arizonae*)

Status and range: The catastrophic decline of the Bell's Vireo is unparalleled in the ornithological history of California. Two races breed in the state. The Least Bell's Vireo

(*V. b. pusillus* was added to the state endangered species list in 1980. The race *arizonae* once bred commonly throughout the Colorado River Valley in California (Grinnell and Miller 1944) and was considered "one of the most characteristic avifaunal elements of the riparian strip" (Grinnell 1914). By the 1950's, the population was greatly reduced (Monson 1960) and it is now almost gone from the California side of the river.

Reasons for the decline: Although destruction of riparian habitat probably is partly responsible for the decline, the present critical status of this species in California is almost certainly due to brood parasitism by the Brown-headed Cowbird. Many areas formerly supporting this species still have suitable habitat but Bell's Vireos are absent (Gaines 1974). The rate of decline of the Bell's Vireo and several other favored cowbird hosts in lowland riparian areas (see Willow Flycatcher, Yellow Warbler, and Yellow-breasted Chat) coincides with the spectacular increase in numbers of the Brown-headed Cowbird in California (Grinnell and Miller 1944, Gaines 1974). Cowbird parasitism can have severe detrimental effects on a bird population (Mayfield 1977). Destruction of willow-cottonwood riparian woodland may have been significant in reducing populations below levels capable of withstanding increasing cowbird densities.

Recommendations: (1) Add the Arizona Bell's Vireo to the Federal and State endangered species lists, and designate critical habitat at all localities where Bell's Vireos are present during the nesting season. (2) Initiate cowbird removal programs on an experimental basis during the breeding season at Bell's Vireo nesting localities. Cowbird removal programs in Michigan have been very successful in maintaining populations of the endangered Kirtland's Warbler (Mayfield 1977). (3) Protect riparian areas and adjacent mesquite woodland in the Colorado River Valley.

SECOND PRIORITY LIST

FORK-TAILED STORM-PETREL (*Oceanodroma furcata*)

Status and range: Lack of thorough, quantified surveys in the past prevents accurate assessment of population trends, but this species has disappeared from three breeding sites known to be occupied in California in earlier years (Harris 1974). Recent surveys of known and potential breeding sites in Del Norte and Humboldt counties indicate fewer than 200 pairs now breeding in California (Osborne 1971; Ainley and Whitt 1973; Harris 1974). Over half of the California population breeds on Little River Rock, Humboldt Co., the southernmost known breeding locality for this species.

This species has definitely become much rarer offshore in the last 15 years, perhaps reflecting a decline on the breeding grounds.

Reasons for the decline: Erosion of precious soil on nesting islands, resulting from human visitation by boat or on foot at low tide, is one probable reason for the decline. "This habitat destruction will soon lead to the birds' disappearance unless people are kept off

the rocks. The erosion during the winter is greatly increased when there have been people on the rookery" (Osborne 1971). Although chances of accidental introduction of cats or rats from small boats are very small, these cavity nesting birds are extremely vulnerable to terrestrial predators. Human disturbance at one former nesting site eliminated the local breeding population (Harris 1974). Perhaps cyclic changes in ocean temperatures are partly responsible, especially for the decline of offshore storm-petrel sightings. Increasing populations of cormorants and murrelets nesting at some breeding sites have resulted in increased soil erosion and reduced burrow availability for this species (S. Harris, pers. comm.).

Recommendations: (1) Maintain nesting islands free from human disturbance, especially the three major breeding sites: Little River Rock and Green Rock in Humboldt Co. and Castle Island in Del Norte Co. (2) Prohibit boat landings (except by authorized personnel) at these islands at any time of year. (3) Prohibit human access by foot at low tide to breeding sites. (4) Consider discouraging cormorants and murrelets from nesting in the microhabitat used by the petrels.

DOUBLE-CRESTED CORMORANT (*Phalacrocorax auritus*)

Status and range: The Double-crested Cormorant formerly bred on coastal cliffs and offshore islands along the coast from Marin Co. south to La Jolla, San Diego Co., and in the interior in northeastern California, the Sacramento Valley, the San Joaquin Valley, and the Salton Sea (Grinnell and Miller 1944). Recent surveys have revealed breeding populations from Marin Co. north to the Oregon border (Chandik and Baldrige 1969; Osborne 1971). This species also nests along the Colorado River, but nesting sites are on the Arizona side of the river (Monson 1949). Now it has disappeared as a breeding bird from the Sacramento and San Joaquin valleys and the Salton Sea. Tulare Lake in the San Joaquin Valley, where hundreds of nests were located by Goldman (1908), is now unsuitable as nesting habitat. Similarly, Buena Vista Lake, where this species once bred in "immense numbers" (Linton 1908), is no longer suitable. No nests have been noted at the Salton Sea in many years, although 100 nests were present in one rookery alone as recently as 1956 (Small 1956). Coastal breeding populations have also declined in southern and central California. This species no longer nests in San Diego Co. (P. Unitt, pers. comm.), and populations on the Farallon Islands once numbered in the thousands in the 19th century but were reduced to 20-40 pairs by the early 20th century. Historical trends in the breeding population in northeastern California are not known, but D. Winkler (pers. comm.) estimates the total breeding population in the Klamath refuges not to exceed 200 pairs. A small breeding population exists at Butt Lake, Plumas Co. (K.S. Kahre, pers. comm.). The breeding population at Hartson Reservoir at Honey Lake, Lassen Co., seems to fluctuate greatly; the count in 1966 was 20 pairs (A. Lapp, pers. comm.), 150 in 1976 (Winter and Erickson 1976), and zero in 1977 (A. Lapp, pers. comm.).

Some additional current population estimates are: coastal Del Norte and Humboldt counties, 263 pairs (Osborne 1971) and 120 pairs (Ainley and Whitt 1973); near Jenner, Sonoma Co., 12 pairs in 1976 and 30 pairs in 1977 (ABF); Farallon Islands, 40 pairs in 1972 (Ainley and Lewis 1974); Pfeiffer Burns State Park, Monterey Co., one pair (Chandik and Baldrige 1969); Prince Is., off San Miguel Is., 60 pairs; Anacapa Is., seven pairs; Sutil Is., off Santa Barbara Is., 30 pairs; Santa Barbara Is., ten pairs (1977 Channel Is. data courtesy H. L. Jones); Eagle Lake, Lassen Co., 11-12 pairs in 1974-75 (Stallcup and Greenburg 1974b; Lederer 1976) but zero in 1977 (D. Winkler, pers. comm.); Bridgeport Res., Mono Co., six pairs in 1974 (Stallcup and Greenberg 1974b) but zero in 1977 (D. Winkler, pers. comm.); and Black Point Cutoff, Solano Co., 43 nests in 1975 but zero in 1977 (ABF).

This species has been declining in much of its North American range. It has also declined along the western coast of Baja, California and within the Gulf of California (D. G. Ainley, pers. comm.).

Reasons for the decline: Habitat destruction and human disturbance, particularly from boating (Lederer 1976), appear to be the main causes for the decline of the inland populations. The Channel Islands' populations have declined due to eggshell thinning from DDE contamination and to some extent human disturbance at nest sites (Gress et al. 1973). For instance, the Anacapa Is. population experienced complete reproductive failure in 1971 when the population was at least 48 pairs (note 1977 estimate of seven pairs). To what extent inland populations, most of which winter in coastal waters, are affected by pesticide residues is unknown. The Farallon Islands population has declined to its current level due to a combination of human disturbance at nest sites, and disappearance of sardine populations (Ainley and Lewis 1974). Cormorants are particularly valuable to human disturbance at nest sites (Ainley and Lewis 1974; Kurv and Gochfeld 1975).

Recommendations: (1) Maintain ban on the use of persistent pesticides. (2) Eliminate boating and other human disturbance in vicinity of nesting colonies during the breeding season. (3) Maintain habitat integrity at inland breeding areas, with particular attention to maintaining a constant water level in reservoirs.

MARSH HAWK (*Circus cyaneus*)

Status and range: This species has greatly declined in California as a breeding bird, the decline being already conspicuous by the 1940's (Grinnell and Miller 1944). It used to be a common resident in the southern coastal area (Willett 1912). At present, nesting localities are still scattered throughout the state, but numbers are much reduced, particularly in the southern coastal area, around San Francisco Bay, and in the Mono Lake area (Gaines 1977). Numbers in the Santa Clara Valley have also diminished (Chandik and Baldrige 1969), and Sacramento Valley populations are much depleted from former levels (D. Gaines, pers. comm.). The bulk of the breeding population is

concentrated in ungrazed portions of state and federal wildlife refuges. Some current estimates are as follows: Mendota Wildlife Area, five pairs (R. B. Reno, pers. comm.); Merced National Wildlife Refuge, four pairs (L. Littlefield, pers. comm.); San Luis National Wildlife Refuge, 15 pairs (I. Littlefield, pers. comm.); Los Banos Wildlife Area, 25 pairs (J. Cawthon, pers. comm.). Sacramento National Wildlife Refuge, one to two pairs (S. Laymon, pers. comm.); Gray Lodge Wildlife Area, 10-15 pairs (J. Cowan, pers. comm.); Honey Lake Wildlife Area, six pairs (A. Lapp, pers. comm.); and Klamath Basin refuges, considered "very abundant" (M. Taylor, pers. comm.).

Wintering populations are much larger, but these have also declined. There was a steady decrease in Marsh Hawk numbers from the early 1950's until about 1965 and then a very slight increase through 1969, but numbers are still below 1953 levels (Brown 1973). There actually may have been a steady decline from the early part of the century as indicated by Tyler (1913) for the Fresno area: "Formerly this hawk was an abundant winter visitant over the lowlands almost everywhere in the valley, but like nearly all the birds of prey, it seems unable to withstand the onward march of civilization. It has been much reduced in numbers throughout the region and has completely disappeared from some of the more thickly settled areas."

Reasons for the decline: Destruction of marsh habitat is undoubtedly the major reason for the decline. Grazing has certainly had an adverse effect on populations nesting in grasslands.

Recommendations: (1) Protect marsh habitat throughout California, as well as suitable grasslands in the lowlands. Grazing in and around marsh borders should be eliminated in late winter and spring to protect the nest sites of this ground nester. (2) Manage wetlands in the Central Valley to maintain marshes during spring and summer months.

OSPREY (*Pandion haliaetus*)

Status and range: Formerly a breeding bird throughout much of California, this species had declined by the 1940's (Grinnell and Miller 1944) and is now found mainly in a few areas in northern California. The remaining areas have almost certainly always been the center of abundance for this species in the state. The Osprey has vanished as a nesting species almost completely from southern California, including the Channel Islands. The only known nest sites today are Lake Casitas, Ventura Co. (McCaskie 1974b) and Tinnemaha Res., Owens Valley, Inyo Co., (McCaskie 1974b, 1976b; which has not been successful (T. Heindel, pers. comm.). In northern California, there still are healthy populations just inland from the coast from Sonoma Co. north and in Shasta, Lassen, and Plumas counties. Small numbers are found elsewhere along the northern edge of the state. Major nesting areas include Eagle Lake (52-58 pairs; Lederer 1976, Garber 1972); Klamath Natl. Forest, Siskiyou Co. (14 pairs; Winter and Erickson 1976b); Humboldt Redwoods State Park (five pairs; ABF); Duncan Mills, Sonoma Co. (three to four pairs; ABF); and Kent Lake, Marin Co. (12 pairs; G. Gould, pers. comm.).

Overall reproductive rates (despite high egg failure rates) in Lassen and Plumas counties show no apparent signs of failure due to pesticide contamination (Garber 1972). However, in view of this species' dramatic decline in the eastern United States in the 1960's due to DDE contamination (Schmid 1966, Ames and Wiemeyer 1971, Mersereau 1964, Ames 1966, Henny and Ogden 1970, Rees 1970, 1977), California populations must be treated as highly vulnerable.

Ospreys have been seen through the summer months at such former or potential nesting areas as West Pond (Imperial Dam), Salton Sea, Newport Bay, Buena Vista Lagoon (San Diego Co.), Big Bear Lake, and Lake Cachuma (Santa Barbara Co.), and perhaps might be induced to breed if suitable nest sites were available.

Reasons for the decline: Removal of nesting trees, degradation of river and lake environmental quality, boating on nesting lakes, and shooting must all be in part responsible for the decline. Southern California populations had disappeared long before the pesticide era (I. L. Jones, pers. comm.). Egg failure rates of 50% (1970) and 28% (1971) in Lassen and Plumas counties suggests that pesticide contamination may be present (Garber 1972).

Recommendations: (1) Maintain restrictions on use of persistent pesticides in the United States. (2) Protect nesting trees, many of which are dead and thus susceptible to tree removal operations. (3) Where needed, restrict boating during breeding season on lakes fished by Ospreys. (4) Provide man-made nesting sites (Valentine 1967; Kahl 1971, 1972) to attempt to restore Osprey populations in the southern portion of the range.

SNOWY PLOVER (*Charadrius alexandrinus*)

Status and range: Information on population trends of the Snowy Plover in California is scant. Grinnell and Miller (1944) had already detected a decrease in abundance by the 1940's. Recent surveys along the coast of northern California between Marin Co. and the Oregon border documented fewer than 100 pairs (PRBO Newsletter No. 42, 1977). In Santa Cruz Co., only two breeding localities remain: the mouth of the Pajaro River, and Wilder Beach, which is still closed to the public. Former Santa Cruz Co. breeding areas such as Waddell Beach, Twin Lakes Beach, and probably many others are no longer used due to heavy human disturbance (R. Morgan, pers. comm.). In the Santa Barbara area, this species now summers only very locally, with most of the birds (about 20) present at McGrath State Beach, Ventura Co. (P. Lehman, pers. comm.). In northern San Diego County, this species has become rare as a breeder due to heavy human use of the beaches, particularly by dune buggies and motorbikes (A. Fries, pers. comm.). Populations in south San Francisco Bay seem to be doing well, nesting on dikes in salt ponds, and may number 150 pairs (Gill 1977). Populations on the Channel Islands, where disturbance on beach nesting areas is minimal, are doing very well (H. L. Jones, pers. comm.).

Large numbers have been found inland at Mono Lake, Mono Co. (17 pairs, Gaines 1977; 80 birds, PRBO Newsletter No. 42, 1977) and Owens Lake, Inyo Co. (130 birds, McCaskie 1975c). Small breeding populations have also been found elsewhere inland at Tecopa, Inyo Co. (McCaskie 1975c), Deep Springs, Inyo Co. (McCaskie and Pugh 1964), Lake Elsinore, Riverside Co. (McCaskie 1974b), and Salton City, Imperial Co. (G. McCaskie, pers. comm.). This species has also on occasion nested in the Central Valley and might do so regularly if there were more suitable habitat available. A pair bred at Woodland, Yolo Co., in 1963 (DeBenedictis and Chase 1963) and 1970 (Baldrige et al. 1970).

Reasons for the decline: Human harassment and direct destruction of nest sites and breeding habitat are reasons for its decline. Wherever these birds are left undisturbed in suitable habitat, such as on the Channel Islands, they prosper. The recent Point Reyes Bird Observatory survey found that almost every beach with suitable nesting habitat, no matter how remote, showed signs of dune buggy use. An instance of deliberate harassment by dune buggy enthusiasts was recorded. The chicks have a tendency to crouch in vehicle tracks in the sand for cover. (PRBO Newsletter, op. cit.).

Recommendations: (1) Eliminate vehicles from critical nesting areas. (2) In areas of heavy human use on nesting beaches, restrict human and dog access to sections of suitable habitat to create refugia nesting birds.

GULL-BILLED TERN (*Gelochelidon nilotica*)

Status and range: This species colonized California as a breeding bird when the Salton Sea was formed in the early part of this century. The size of the breeding population declined from 500 pairs in the first survey in 1927 to fewer than 200 pairs in 1937 (Grinnell and Miller 1944) and 60 pairs in 1952 (Small 1952). Seventy-five pairs were counted in 1957 (Small 1957), 40-50 pairs in 1959 (Small 1959a, 1959b), and only a few pairs through most of the 1960's (Small 1961, Pugh 1965, McCaskie 1968, 1970, 1971). In 1976, 17 pairs nested (McCaskie 1976b) and perhaps twice this number may have nested in 1977 (J. Dunn, pers. Comm.).

Reasons for the decline: Rising water levels inundating nesting islands and beaches and adjacent marsh habitat has probably been the major cause of the decline. In an area such as the Imperial Valley, where pesticides are liberally applied, pesticide contamination is a possibility.

Recommendation: Create and maintain artificial nesting islands for this species around the southern and northern shores of the Salton Sea, using specifications given by Grant and Hogg (1978). The presence of just a few suitable nesting islands would most likely allow this species to persist in California.

TUFTED PUFFIN (*Lunda cirrhata*)

Status and range: The Tufted Puffin once bred along the coast of California as far south as the Channel Islands and was known to breed along a number of coastal cliffs as well as offshore islands (Grinnell and Miller 1944). Now this species is no longer known to nest in southern California. It was once a common breeding bird on San Miguel Is., Anacapa Is., and probably Santa Barbara Is., with a total population of at least 75 pairs in 1900; but none have bred since 1915 (H.L. Jones, pers. Comm.). Numbers in northern California have also declined. The population on the Farallons declined from "several thousand" birds in 1911 to only 30-35 pairs in recent years (Ainley and Lewis 1974, Ainley and Whitt 1973). Only one pair now nests on Flatiron Rock, Humboldt Co., where as many as 24 pairs may have nested at one time (Osborne 1971).

The only other current nesting localities south of Humboldt Co. are Arch Rock, Sonoma Co. (one or two pairs; B.D. Parmeter, pers. comm.), and Piedras Blancas, San Luis Obispo Co. (one pair; Osborne 1971). One or two pairs are suspected to breed at Chimney Rock, Point Reyes Natl. Seashore (Winter and Morlan 1977) and at Pedro Point, San Mateo Co. (ABF). Thus the total population breeding in California may be as low as 74 pairs, 60 of which are found at two localities: the Farallons and Castle Rock, Del Norte Co.

Reasons for the decline: Decline of sardine populations may be the main factor causing the decline (Ainley and Lewis 1974), although oil pollution (D. G. Ainley, pers. comm.) and disturbance by humans at nest sites may have affected puffins at some localities. A major oil spill near a nesting site could have severe consequences for this species as well as several other Special Concern species. Populations on the Farallons have begun to increase now that European hare populations have been eliminated (R. Stallcup, pers. comm.).

Recommendations: (1) Eliminate human disturbance and oil drilling at or near nesting sites. (2) Prohibit boat landings on islands where nesting occurs, except by authorized persons.

BURROWING OWL (*Athene cunicularia*)

Status and range: This species was formerly a common, even locally abundant, permanent resident throughout much of California, but a decline noticeable by the 1940's (Grinnell and Miller 1944) has continued through to the present time. The decline has been almost universal throughout California. Virtually every observer has expressed concern for the future of this species in his area. There have been no records in northern Napa Co. for 15 years (E. W. Tillay, pers. comm.). There has been a steady decline in numbers reported in Sonoma Co. in recent decades (B. D. Parmeter, pers. comm.). They continue to decline in eastern Alameda Co. and are decreasing in Palo Alto (Stallcup and Greenberg 1974a, 1974b). In the Stockton area, known populations consisting of at least

17 pairs have dwindled to no more than three pairs in the last ten years (D. M. Shanks, pers. comm.). Numbers are decreasing in the Fresno area (R. Hansen, pers. comm.). In Tulare Co., it is estimated that there has been a 70% reduction in suitable habitat in just the last ten years (R. A. Barnes, pers. comm.). It is nearly extinct in San Mateo Co. (ABF), and has greatly declined in Santa Cruz Co. where it was a common bird in the early part of this century (R. Morgan, pers. comm.). Numbers have gone way down in the Santa Barbara region (P. Lehman, pers. comm.), and in the Los Angeles region (A. Small, pers. comm.) where once a common resident (Willett 1912). Its numbers have also declined in San Diego Co. (A. Fries, J. Dunn, pers. comm.) It was described as "ficommon everywhere" in the Escondido area in the early part of this century (Sharp 1907).

As with the Marsh Hawk, the stronghold of this species may be the state and federal wildlife refuges. The population at San Luis National Wildlife Refuge is estimated to be 25 pairs (L. Littlefield, pers. comm.) and at Mendota Wildlife Area, 30 pairs (R. B. Reno, pers. comm.)

Reasons for the decline: Conversion of grasslands and pasturelands to agriculture and destruction of ground squirrel colonies have been the main factors causing the decline of the Burrowing Owl population (Zarn 1974b). Assimilation of poisons applied to ground squirrel colonies has probably also taken a toll. Their propensity for nesting in roadside banks also makes them particularly vulnerable to roadside shooting, being hit by cars, road maintenance operations, and general harassment. Vicenty (1974) reported three nests destroyed by road construction and one burrow deliberately destroyed by motorcyclists.

Recommendations: (1) Encourage farmers to protect this rodent-eating owl and to avoid disturbing nesting burrows and areas around nest sites. If farmers were made aware of the feeding habits of this bird, they might be more inclined to spare its nest sites from the plough. (2) Protect ground squirrel colonies supporting Burrowing Owls. (3) Manage upland areas in state and federal wildlife refuges to benefit this species.

SPOTTED OWL (*Strix occidentalis*)

Status and range: This species is an uncommon permanent resident in heavily forested areas in the coastal ranges of southern California from San Luis Obispo Co. to San Diego Co., including the San Bernardino and San Jacinto mountains, along the coast of northern California from Marin Co. north, and in the Sierra Nevada from Plumas Co. to extreme northern Kern Co. (Grinnell and Miller 1944, Gould 1974). Isolated populations also occur in the Santa Cruz Mountains and Santa Lucia Mountains (Gould 1974). A total of 192 territories was located in a recent survey of the population in California; an average distance of 2.2 miles between adjacent pairs indicates a very low density in comparison to other birds (Gould 1974). Further surveys have now pinpointed a total of 317 territories (Gould 1977). This species' presence at only 73% of the historically occupied sites surveyed indicates a significant decrease in population levels. This estimate of a

27% reduction in occupied sites is conservative since a majority of these historical sites are on protected lands and did not include areas of major habitat disruption where absentee rates would certainly be much higher (Gould 1974). The extensive logging which has occurred in the Sierra Nevada and along the north coast certainly must have reduced populations of this species which favors virgin timber.

Reasons for the decline: Habitat destruction, primarily due to logging, is the major threat (Zarn 1974a). Fortunately, much suitable habitat remains in regional and state parks. Nest sites within parks are potentially threatened by increased human use and associated disturbances.

Recommendations: (1) Protect large tracts of old growth, multilayered forest in nesting areas using the guidelines proposed by Gould (1974). (2) Survey public and private lands proposed for timber sales to determine if Spotted Owls are present. (3) Where Spotted Owls are known to occur, selectively cut and thin forest instead of clear cutting, retain hardwood understory, and save nest trees. (4) Although this species seems tolerant of low levels of inadvertent human disturbance, known nest sites in parks should be protected from human disturbance and access should be restricted.

LONG-EARED OWL (*Asio otus*)

Status and range: Once a common to abundant permanent resident in many parts of California, this species had begun to decline by the 1940's (Grinnell and Miller 1944), and decline has continued through the present. Now any sighting of a Long-eared Owl is unusual, although this secretive species may be more common than the paucity of recent records indicates. Areas in which the decline has been most severe are the Sacramento Valley, where it is probably extirpated (Gaines 1974, pers. comm.), the San Joaquin Valley (R. Hansen, pers. comm.), and the San Diego area (P. Unitt and J. Dunn, pers. comm.). All three of these areas were once considered "centers of abundance" for this species in California (Grinnell, and Miller 1944). Sharp (1907) found the owl to be very common in the Escondido area of San Diego Co.: "Common resident. Up to a few years ago almost every old crow's, hawk's, or rat's nest along the river in San Pasqual had its pair of owls." This species has not been recorded in this area in many years. It was formerly a fairly common resident in the Los Angeles region (Willett 1912) where today it is seldom reported. No nests have been reported in recent years in the San Francisco Bay area., where it was once considered a sparse local breeder (Grinnell and Wythe 1927). This species was fairly common and breeding in Santa Cruz Co. at the turn of the century. Five nests were located as recently as 1947, but today it no longer breeds (R. Morgan, pers. comm.). It has also disappeared from the Santa Barbara area as a breeding species. The last nesting in this area was recorded in 1972 (P. Lehman, pers. comm.). Populations in the Yosemite National Park area have also declined (Gaines 1977). Numbers elsewhere in California are very low but may have always been so. The Long-eared Owl is still fairly common in willow thickets along the Susan River and other streams in the Honey Lake area (T. Manolis, pers. comm.) and in the Owens Valley (T.

Heindel, pers.comm.). Small numbers also breed at certain desert oases, such as Yaqui Wells, San Diego Co., Morongo Valley, San Bernardino Co., and Oasis Ranch, Mono Co. The status of this species in the montane regions of California is poorly known.

Reasons for the decline: Destruction of lowland riparian woodland has played a role in the decline, but the absence of this species from existing riparian areas and its disappearance from many areas before the habitat was destroyed indicates that other factors are involved. Sharp (1907) was perplexed by this species' decline in the Escondido area: "Of late, for some unknown reason, they have been less plentiful. As probably half of the eggs produced were successfully hatched (to make a very low estimate) and the birds are seldom molested, it is rather difficult to account for their apparently diminishing numbers." Road kills by high-speed cars may have an impact on populations, as the birds seem very prone to collide with autos (R. Stallcup, pers. comm.). This species' nests are rather conspicuous, making the birds vulnerable to shooting and harassment (D. Gaines, pers. comm.).

Recommendations: (1) Protect lowland riparian habitat, particularly along the Owens River in the Owens Valley and the Susan River in the Honey Lake area, and also in the Central Valley and coastal San Diego Co. (2) Conduct surveys to determine whether population status warrants placement of Long-eared Owl on Highest Priority List.

SHORT-EARED OWL (*Asio flammeus*)

Status and range: Small numbers once bred locally throughout California where suitable habitat was available (Grinnell and Miller 1944). Now this species has completely vanished as a breeding bird from the southern coastal area (J. Dunn, P. Unitt, pers. comms.) and perhaps the San Joaquin Valley (R. Hansen, pers. comm.). A nest near Davis in 1976 was the first nesting record in many years in the Sacramento Valley (Winter and Erickson 1976, Chandik and Baldrige 1967). The only currently known nesting localities near the coast are Bair Island in San Francisco Bay (Remsen and Gaines 1973a, Gill 1977), the mouth of the Salinas River, Monterey Co. (Greenberg and Stallcup 1974; B. G. Elliott, pers. comm.; Winter and Morlan 1977), and perhaps near Moss Landing (Remsen and Gaines 1973a). Although it nested at the Palo Alto Baylands for at least two years (Greenberg and Stallcup 1974), it has not done so in the last three years (T. Chandik, pers. comm.). This species formally nested in the Mono Lake area but is no longer known to do so (Gaines 1977). A few pairs are presumably nesting at Honey Lake Wildlife Area (T. Manolis, pers. comm.). Status elsewhere in northeastern California is poorly known.

This species is more common in winter, but certainly can no longer be considered "common" as it was by Willett (1912) and Grinnell and Miller (1944), who noted a reduction in wintering populations even by the 1940's. It is now decidedly uncommon in winter in southern California (McCaskie 1974c). The Short-eared Owl has declined in many parts of North America.

Reasons for the decline: Destruction of marsh and tall grassland habitat in lowlands is certainly the main cause for the decline. Grazing of existing marshes and tall grasslands and shooting have apparently eliminated most birds in remaining habitat. This species is especially vulnerable to shooting.

Recommendations: (1) Protect existing marshes and ungrazed grasslands in the lowlands. (2) Educate the public on the value of raptors and the fines for shooting them.

GILA WOODPECKER (*Centurus uropygialis*)

Status and range: This species is a permanent resident in riparian woodland and cottonwood groves along the Colorado River (Grinnell and Miller 1944), but numbers have greatly declined in the last few decades (G. McCaskie, pers. comm.), it is now found at only a few scattered localities. This is a dramatic change from the situation described by Grinnell (1914): "Common and characteristic resident the whole length of the region from Needles to the vicinity of Yuma. Found at every station on both sides of the river. While regularly present in the willows and cottonwoods of the river bottom, the species occurred also up the desert washes a mile or more from the edge of the riparian strip" Hollister (1908) described it as common in timbered bottomlands of the Colorado River near Needles, which is no longer the case.

The Gila Woodpecker expanded its range into the Imperial Valley in the early 1900's (Grinnell and Miller 1944) and up until recently, was found wherever there were cottonwoods; virtually every farmhouse had a pair (G. McCaskie, pers. comm.). Now this population has been reduced to a few pairs near Brawley.

Reasons for the decline: Destruction of the riparian woodland of the Colorado River Valley is the main reason for the decline. Displacement from nest sites by Starlings may also have affected this species. The Imperial Valley, where habitat still exists, lacks Gila Woodpeckers but now has many Starlings (G. McCaskie, pers. comm.).

Recommendations: (1) Protect riparian woodland in the Colorado River Valley and cottonwood groves in the Imperial Valley. (2) Acquire land suitable for restoration of riparian woodland in the Colorado River Valley (see Gilded Flicker). (3) Experiment with Starling control methods near Gila Woodpecker nesting sites.

BANK SWALLOW (*Riparia riparia*)

Status and range: This species once bred locally throughout much of California in the lowlands (Grinnell and Miller 1944). It once bred along the coast from Santa Barbara Co. to San Diego Co. but it has since completely disappeared as a breeding bird from southern California (J. Dunn, pers. comm.). Numbers elsewhere in the state have also

been reduced. For instance, the Bank Swallow was described as common to abundant around Santa Cruz Co., and there were still some colonies active into the early 1960's. Now it is extirpated from Santa Cruz Co., where at least six former colonies are inactive (R. Morgan, pers. comm.).

Elsewhere, the only known breeding areas are: Ocean Beach, San Francisco Co. (100 pairs; Cutler and Pugh 1960); Ano Nuevo Point, San Mateo Co. (six pairs; Stallcup and Greenberg 1974b); along Trafton Rd. on the Pajaro River, Monterey Co. (under 50 pairs; Greenberg and Stallcup 1974); just north of King City, Monterey Co. (15-20 pairs; R. Branson, pers. comm.); between Red Bluff and Tehama on the Sacramento River (five colonies with a total of 442 birds; Stallcup and Winter 1976a); near Chico, Butte Co. (23 pairs; Greenberg and Stallcup 1974); several localities in the Sacramento area (ABF); the Honey Lake area (one or two colonies; T. Manolis, pers. comm.); vicinity of Lower Klamath National Wildlife Refuge (several colonies; M. Taylor, pers. comm.). This species apparently no longer breeds in the Owens Valley (T. Heindel, pers. comm.). The total population breeding within the State is extremely low relative to that of other species of swallows.

Reasons for the decline: Unknown, especially for coastal populations where coastal cliffs used for breeding are often still intact. Inland, channelization of rivers and erosion-control and bank stabilization programs have destroyed former nesting sites. Channelization of rivers is the most insidious, long-term threat to this species; almost all colonies in the Sacramento Valley will be destroyed by planned bank "protection" projects by the Army Corps of Engineers. Breeding in compact colonies makes this species vulnerable to harassment by humans, and the low number of colonies in California augments this vulnerability. The Pajaro River colony is currently threatened by hill-climbing motorcyclists.

Recommendation: Protect all remaining nesting colonies in California from habitat destruction and from human harassment.

PURPLE MARTIN (*Progne subis*)

Status and range: At one time, the Purple Martin was a fairly common breeder in the coast ranges the length of the state and in smaller numbers in the Sierra Nevada. It was even thought to be increasing in some populated areas (Grinnell and Miller 1944). In the last 15 years, there has been a dramatic decrease in southern California where it was once a common breeder in the mountains and where it even nested in some lowland residential areas (Willett 1912). The decline has been so drastic that fewer than a dozen birds were reported in summer 1976 (McCaskie and Pugh 1964; McCaskie 1973b, 1974b, 1975a, 1976b; A. Fries, pers. comm.; G. S. Suffel, pers. comm.). In the 1920's, this species even nested in downtown Pasadena and Newport Beach (Rowland Ross, pers. comm. to G. S. Suffel), but the situation now is so severe that in 200 hours of field work in the San Bernardino Mountains in 1977, not a single bird was seen (K. Garrett, pers. comm.).

Decreases have been noted in Tehama County in the riparian habitat along the Sacramento River (T. Stone, pers. comm.). Decreases have been noted in Marin Co. (DeSante and Remsen 1972; W. M. Pursell, pers. comm.), Santa Cruz Co. (R. Morgan, pers. comm.), the Diablo Range (A. Edwards, pers. comm.), and the Oroville area (S. Laymon, pers. comm.). Numbers in the Sacramento area and along the north coast are apparently holding their own. Numbers in the Sierra foothills are low but have probably always been so.

Reasons for the decline: Introduced Starlings have been noted ousting Purple Martins from nest cavities at a number of localities, and competition for nesting sites with Starlings is likely to be at least partly responsible for the decline. Removal of dead trees (snags) has eliminated nesting sites in several areas.

Recommendations: (1) Experiment with methods for Starling control at Purple Martin nest sites. (2) Retain snags wherever possible, these are important nest sites for this species as well as bluebirds, chickadees, nuthatches, etc. (3) Erect nest boxes in areas where Purple Martins still nest. Artificial nest boxes have been used by martins in Oregon (K. Klimkiewicz fide A. Craig).

BLACK-TAILED GNATCATCHER (*Polioptila melanura*)

Status and range: Two distinct subspecies are permanent residents in California: *P. m. lucida* in the southeastern deserts north to southern Inyo Co. and northwestern San Bernardino Co., and *P. m. californica* in coastal southern California north to Ventura Co. (Grinnell and Miller 1944). Populations of *californica* are now very reduced and extremely local. Numbers have declined throughout much of its range (McCaskie and Pugh 1964), a decline noticeable by the 1940's (Grinnell and Miller 1944). This subspecies was once a common resident in the southern coastal area (Willett 1912). There are no recent records from Ventura Co. and populations in Los Angeles Co. are very small and local, with a center of abundance on the Palos Verdes Peninsula (J. Dunn and H. L. Jones, pers. comm.). Of 13 Christmas Counts within this subspecies' range in the southern coastal area, in 1976 only three recorded Black-tailed Gnatcatchers (seven at San Diego, six at Palos Verdes, and three at Oceanside-Vista-Carlsbad); this is an amazingly low total considering the huge number of party-hours involved on these counts.

Populations of *lucida* have declined in the Imperial Valley and Coachella Valley; once fairly common in these areas, this species is now very difficult to find. For example, the 1976 Christmas Counts at the Salton Sea recorded three birds at the north end and one at the south end; this compares with 87 Verdins at the north end and 254 at the south end; the Verdin has similar habitat requirements and is more or less the same body size. Populations in the mesquite brushlands bordering the Colorado River have also declined, but are probably holding their own at the present (D. Gaines, pers. comm.). Although recorded breeding as far north as southern Inyo Co., there have been no records from

Inyo Co. in recent years (J. Dunn, pers. comm.). Populations in the large washes emptying into the Colorado River are apparently still healthy, but these washes are the preferred racing grounds of the ever-growing swarms of off-road vehicles.

Reasons for the decline: Extensive destruction of coastal sage habitat in the southern coastal area is probably the main reason for the decline of californica; coastal sage communities have suffered greatly from housing developments. Destruction of mesquite brushland in the Coachella, Imperial, and Colorado River valleys is the main factor in the decline of lucida. Destruction of habitat in desert washes by off-road vehicles has also probably reduced numbers. Both subspecies are parasitized by the Brown-headed Cowbird, but the impact of parasitism is unknown.

Recommendations: (1) Protect surviving areas of coastal sage and inland chaparral supporting this species. (2) Protect dense catclaw acacia-smoketree washes in the Colorado and Mojave deserts. (3) Prohibit off-road vehicle activity in desert washes that provide, or could provide, gnatcatcher habitat. (4) Protect mesquite brushlands in the Coachella, Imperial, and Colorado River valleys.

GRAY VIREO (*Vireo vicinior*)

Status and range: This species was once a locally common summer resident on the desert slopes of the mountain ranges of southern California; it was known from many localities in the San Gabriel, San Bernardino, San Jacinto, and Laguna mountains (Grinnell and Miller 1944). Today it is known in these ranges only from one area (Round Valley) in the eastern San Bernardino Mountains where at least four pairs have been found in recent years (McCaskie 1968, 1973b, 1974b), and from south-facing slopes in the Laguna Mountains at about 3000 ft. elevation in 1977 (McCaskie 1977b). Additionally, one pair was present near Pinyon Flats, in the Santa Rosa Mountains, Riverside Co. in 1977 (S. Goldwasser fide S. Cardiff). Grinnell and Swarth (1913) used known territory size and amount of suitable habitat available to estimate 480 pairs present on the desert slopes of the San Jacinto Mountains; whether any birds still exist in this area is not known.

There are also small populations in the desert mountain ranges: two or three pairs on Clark Mountain, three or four pairs in the Mid Hills, and five or six pairs in the New York Mountains, all San Bernardino Co. (Remsen, Cardiff, and Cardiff MS; McCaskie 1975c). There is a breeding season record from the Kingston Range (Grinnell and Miller 1944), but none was found there in a survey in 1977 (Cardiff and Remsen MS). There are also breeding season records from the Kern Basin (Grinnell and Miller 1944).

Reasons for the decline: Unknown. In most cases, habitat destruction is not a factor. Since vireos are highly susceptible to cowbird parasitism, perhaps this is another of the small passerines being decimated by cowbirds. Even remote desert mountain ranges far from agriculture now have cowbirds (Remsen, Cardiff, and Cardiff MS).

Recommendations: (1) Survey areas of former occurrence to determine whether Gray Vireo populations still persist. (2) Determine the effect of cowbird parasitism on this species.

YELLOW WARBLER (*Dendroica petechia*)

Status and range: The Yellow Warbler was once a common to locally abundant summer resident in riparian areas virtually throughout California (Grinnell and Miller 1944), but today populations are much reduced and even extirpated in some areas. The subspecies *D. p. sonorana*, which used to be "abundant" and "everywhere" in riparian woodland of the Colorado River Valley (Grinnell 1914), has been extirpated from California (Monson 1960; D. Gaines, pers. comm.). The subspecies *D. p. brewsteri*, the breeding form throughout the remainder of most of California, has not fared so badly as *sonorana*, but is having problems. Populations in the Sacramento Valley and San Joaquin Valley have virtually disappeared (Gaines 1974; R. Hansen, pers. comm.; Remsen and Gaines 1973; Stallcup and Greenberg 1974b). Only 5% of available habitat is occupied in the upper Sacramento Valley (S. Laymon, pers. comm.). This species has declined in the southern coastal area and is now absent from some areas of former occurrence (McCaskie and Pugh 1964; Pugh 1965; A. Fries, pers. comm.; P. Lehman, pers. comm.). It was once a common summer resident in San Francisco Co. (Ray 1906), but there are no recent breeding records (L. C. Binford, pers. comm.). Breeding populations in Marin Co. have also declined (W. M. Pursell, pers. comm.). Elsewhere along the coast, the Yellow Warbler is still fairly common where suitable habitat remains in Santa Cruz Co. (R. Morgan, pers. comm.), Napa Co. (B. D. Parmeter and E. W. Tillay, pers. comm.), and Mendocino and Lake counties (D. Gaines, pers. comm.). Numbers have declined in Siskiyou Co. (M. Taylor, pers. comm.), and declines have been noted in some areas of the Sierra Nevada such as Yosemite (Gaines 1977). It is still common along streams below about 8000 ft. in the eastern Sierra Nevada (D. Gaines, pers. comm.) and in the Sierra Nevada in Tulare Co. (R. Barnes, pers. comm.).

Reasons for the decline: Destruction of riparian habitat has contributed to the decline, especially in the San Joaquin Valley and Colorado River Valley, but the absence of this species from many areas of suitable habitat and its susceptibility to cowbird parasitism indicates the population explosion of the Brown-headed Cowbird may be the key factor (Gaines 1974).

Recommendations: (1) Protect riparian habitats throughout California, especially in the San Joaquin and Colorado River valleys. (2) Initiate cowbird removal programs at a local level on an experimental basis. (3) Restore willow-cottonwood riparian woodland along the Colorado River.

YELLOW-BREASTED CHAT (*Icteria virens*)

Status and range: The Yellow-breasted Chat was once a fairly common summer resident in riparian woodland throughout California (Grinnell and Miller 1944), but now is much reduced in numbers, especially in southern California. In coastal southern California, where the species was once a common summer resident (Willett 1912), population declines have been noted in several areas. In coastal San Diego Co., Sharp (1907) described its status as "quite common," which is no longer the case. In the Santa Barbara region, this species is definitely declining and is now a very rare and local breeder (P. Lehman, pers. comm.) Along the Colorado River, Grinnell (1914) described it as "abundant," outnumbered only by Yellow Warblers and Song Sparrows; now it is rather rare and local. In the San Joaquin Valley, where once uncommon to common (Tyler 1913, Goldman 1908), this species is now a rare and local breeder (R. Hansen, pers. comm.). In the Sacramento Valley, numbers have declined in the Sacramento area (ABF), but populations are still high in the upper Sacramento Valley (Remsen and Gaines 1973b). Along the coast in northern California, populations have dropped dramatically in Santa Cruz Co., where they were common in the early part of the century, rare by 1947, and are no longer breeding today (R. Morgan, pers. comm.). In Napa and Sonoma counties, it is still fairly common but numbers have declined from former levels (B. D. Parmeter, pers. comm.). Populations are apparently still high in northwestern California (Stallcup and Winter 1975c). Probably reflecting the species' decline as a breeder in California, numbers of migrant chats along the coast have dropped significantly in recent years (R. Stallcup, pers. comm.).

Reasons for the decline: Destruction of riparian woodland has certainly played a role, but this species' absence from some areas which still have intact habitat indicates some other factor is involved, perhaps cowbird parasitism.

Recommendations: (1) Protect riparian habitats throughout California. (2) Restore willow cottonwood riparian areas along the Colorado River (see Gilded Flicker). (3) If cowbird removal programs are initiated for the benefit of the Bell's Vireo and Yellow Warbler, monitor the effect of lower cowbird densities on chat populations to determine the impact of cowbird parasitism.

SUMMER TANAGER (*Piranga rubra*)

Status and range: Grinnell and Miller (1944) considered this species common in riparian woodland along the Colorado River. Now it is much less common, with only scattered pairs found along the Colorado River (G. McCaskie, pers. comm.). It once nested at a few localities in the Coachella Valley, but is no longer known to do so. It is also known to breed at widely scattered localities in the desert: Brock Experimental Ranch, east of Holtville, Imperial Co. (McCaskie, 1968, 1970, 1973b, 1974b, 1975c, 1976b); Morongo Valley, San Bernardino Co. (one or two pairs; McCaskie 1967, 1970, 1972, 1973b, 1974b, 1975c); Mojave Narrows Regional Park near Victorville, San Bernardino Co. (McCaskie 1977b; D. Gaines, pers. comm.); and Amargosa River, south of Tecopa, Inyo

Co. (McCaskie 1973b, 1975c, 1977b). One pair has been noted intermittently at Whitewater Canyon, Riverside Co. (McCaskie 1968, 1971, 1973b).

Reasons for the decline: Destruction of cottonwood habitat, particularly along the Colorado River, is undoubtedly the major cause of the decline. Suitable breeding habitat for this species must include at least some tall trees, preferably continuous cottonwood riparian woodland.

Recommendations: (1) Protect and restore cottonwood habitat along the Colorado River. (2) Protect cottonwood riparian woodland and maintain habitat integrity at Morongo Valley, the Amargosa River, the Mojave River, and Whitewater Canyon.

THIRD PRIORITY LIST

BLACK STORM-PETREL (*Oceanodroma melania*)

Status and range: The only breeding site for this species in the United States was recently discovered on Sutil Island, an islet off Santa Barbara Island (Pitman and Speich 1976). Although only one nest was found, an estimated 10 birds were heard in the vicinity, and the maximum number of breeding pairs was thought to be 10-15. More complete surveys by Bureau of Land Management in 1976 estimated the number of breeding pairs to be 25 (H. L. Jones, pers. comm.). It is quite likely that this population has always been present and has been overlooked until recently (H. L. Jones, pers. comm.).

Potential threats: Accidental introduction of small mammals to breeding islands; human disturbance on breeding islands; oil spills at feeding areas near breeding sites.

Recommendation: Prohibit boat landings on Sutil Island except by authorized persons.

ASHY STORM-PETREL (*Oceanodroma homochroa*)

Status and range: Many Californians regard this species as a very common bird because the well-attended pelagic birding trips on Monterey Bay often record large numbers of this species in early fall, but the single flock of 5-8000 birds often encountered off Moss Landing may contain most of the world's population of this species. The Ashy Storm-Petrel is virtually endemic to California waters. The total population size is relatively minute, probably no more than 3000 pairs. There are only six known breeding localities: Farallon Islands (2000 pairs; Ainley and Whitt 1973, Ainley and Lewis 1974); Bird Rock off Tomales Point, Marin Co. (six pairs; Ainley and Osborne 1972); San Miguel Is., Santa Cruz Io., and Santa Barbara Is. of the Channel Islands; and Los Coronados Islands off extreme northwestern Baja California, Mexico. Recent Bureau of Land Management surveys in the Channel Islands estimate 200 pairs on Prince Island and possibly 200 pairs

on Castle Rock, both islets off San Miguel Is., and 25 pairs on Sutil Is., an islet off Santa Barbara Is. (E. L. Jones, pers. comm.). The sizes of the breeding populations on Santa Cruz Island and Los Coronados are unknown, but certainly not very substantial (H. L. Jones, pers. comm.).

Although there is no reason to suspect current populations are in trouble, the welfare of this storm-petrel is dependent almost entirely upon preservation of its known breeding sites in California, hence the species is very vulnerable.

Potential threats: Accidental introduction of small mammals on breeding islands; human disturbance on breeding islands; oil spills in feeding areas; pesticide contamination. Pesticide concentrations in Ashy Storm-Petrels have been found at levels comparable to those in Brown Pelicans laying thin-shelled eggs (Risebrough et al. 1968), but the magnitude of eggshell thinning has not yet reached the point at which hatching success is affected (Coulter and Risebrough 1973). A major oil spill in Monterey Bay near Moss Landing in late summer or in fall could seriously threaten most of the world's population.

Recommendations: (1) Maintain habitat integrity of all breeding sites, especially the Farallon Islands where at least two-thirds of the entire world population breeds; prohibit boat landings on breeding islands except by authorized persons. (2) Prohibit oil exploration in the vicinity of breeding sites and important feeding and roosting areas, i.e., Monterey Bay near Moss Landing. (3) Maintain ban on persistent pesticides.

LEAST BITTERN (*Ixobrychus exilis*)

Status and range: The Least Bittern formerly bred in small numbers in the Sacramento Valley, the San Joaquin Valley, and in the southern coastal area (Willetts 1912, Grinnell and Miller 1944); these populations are now reduced, but small numbers still persist locally in the Sacramento Valley (ABF), around Los Banos in the San Joaquin Valley (five pairs estimated in 1977: J. Cawthon, pers. comm.), and very locally in San Diego Co. (McCaskie 1974b). Populations at the Salton Sea and along the Colorado River are quite large (McCaskie 1975c), and have apparently increased in historical times, offsetting the declines elsewhere in the state. A few pairs may also breed at Honey Lake Wildlife Area (T. Manolis, pers. comm.), although none were noted in 1977 (A. Lapp, pers. comm.). At least two pairs are believed to be nesting in Saline Valley, Inyo Co. (McCaskie 1975c).

Potential threats: Destruction of freshwater marshes, especially extensive beds of dense, tall cattails.

Recommendations: (1) Maintain habitat integrity of extensive marshes at the Salton Sea and Colorado River Valley. (2) Encourage state and federal refuges in the Central Valley to retain extensive stands of suitable habitat even if no birds are known to be present; this

species is so secretive it may be present where it has not been recorded. Habitat should not be allowed to go completely dry during spring and summer months.

BARROW'S GOLDENEYE (*Bucephala islandica*)

Status and range: The Barrow's Goldeneye is probably extirpated from California as a breeding bird. Small numbers formerly bred on small wooded lakes in the southern Cascade Range and in the Sierra Nevada at least as far south as Fresno Co. (Grinnell and Miller 1944, Small 1974). Although specific reports were few, the extensive area over which this species was reported suggests it was much more widespread and common than literature indicates. There have been no reports of potentially breeding birds in the last 40 years. This species has a very small worldwide population in comparison with other ducks.

Reasons for the decline: Reasons are unknown, but human disturbance from fishing, boating and shooting seems to be a plausible explanation for the decline. The forest management practice of dead tree removal may have reduced nest site availability.

Recommendations: (1) Survey potential goldeneye breeding locations in the Sierra Nevada to determine if breeding birds still exist; this could be combined with a survey for Common Loons. (2) Restrict boating during breeding season and provide nest boxes at any lake found to contain breeding pairs. (3) Discourage dead tree removal in areas where cavities may be used as nesting sites.

HARLEQUIN DUCK (*Histrionicus histrionicus*)

Status and range: The Harlequin Duck formerly bred in small numbers on the rivers of the west slope of the central Sierra Nevada. Grinnell and Miller (1944) give six breeding localities between Tuolumne Co., and Madera Co., but the distribution must have been more widespread. This species has almost completely disappeared from its former breeding range in California. The

only recent report of breeding is from Calaveras Co. on the Mokelumne River 1.5 mi. above Salt Spring where flightless young were seen in 1971, 1972, and 1976, and a lone female in 1968 and 1975 (R. Lee, Jr., and F. Bedford, pers. comm. to D. Erickson; Chandik and Baldrige 1968); never more than one family of Harlequin Ducks has been seen here. A female was also seen near Wawona in the Yosemite area in June 1977 (fide D. Gaines).

Wintering and summering, nonbreeding populations along the coast may have declined as reports from the first half of the century seem high in comparison to recent reports, especially considering the fewer observers and poorer optical equipment used in earlier

years. About 25 individuals are reported annually along the coast of northern California (Stallcup and Greenburg 1974a) and one or two in southern California.

This species has a very small worldwide population in comparison with other ducks.

Reasons for the decline: Human disturbance along streams used for breeding and perhaps damming of rivers seem to be the only plausible reasons for the decline.

Recommendations: (1) Survey former breeding localities for breeding birds, especially the Mokelumne River. This species' habitat is not covered effectively by birders. (2) Restrict human access to breeding sites during breeding season. (3) Provide nest boxes if needed at breeding sites.

GOSHAWK (*Accipiter gentilis*) (=Northern Goshawk)

Status and range: The Goshawk is an uncommon permanent resident in the mountains of California in the Sierra south at least as far as Tulare Co. and in the Coast Range south as far as Mendocino Co. (Grinnell and Miller 1944). There are also summer reports from the San Jacinto Mountains (McCaskie 1977b) and Mount Pinos in the southern Coast Range (McCaskie 1976b), suggesting the presence of isolated breeding-populations further south than the known range. There are no data on Goshawk population trends in California, but this secretive species is reported infrequently, and the total population breeding within California is probably quite small and vulnerable.

Potential threats: Since most of the habitat of this species is within public lands such as National Forests and National Parks, there is comparatively little threat in the way of habitat destruction, but both falconry and logging are potential threats. California populations are probably small enough that the harvest must be limited and carefully controlled.

Recommendations: (1) Survey breeding population in California. (2) Consider limiting the take of this species for falconry in California until population size and effects of falconry are better known.

SHARP-SHINNED HAWK (*Accipiter striatus*)

Status and range: This species formerly bred in small numbers throughout much of northern California and in very small numbers in all the mountain ranges of southern California as far south as the Cuyamaca Mountains, San Diego Co. (Grinnell and Miller 1944). Now the breeding population appears greatly reduced from former levels, but data are lacking. Only a few individuals are reported during the summer months, and almost all of these are from northern California (ABF). The small breeding population in Contra

Costa Co. and northern Alameda Co. has apparently disappeared: the last report of a possibly nesting bird was in 1966 in Strawberry Canyon, Berkeley (ABF). This species was formerly a common resident in Santa Cruz Co., but there is only one recent record of a possibly breeding bird (R. Morgan, pers. comm.).

Much greater numbers winter in California, and these populations, although experiencing a steady decline from the early 1950's through the early 1960's, had stabilized by the mid-1960's and increased to near early 1950's levels by the late 1960's (Brown 1973).

Potential threats: The total population breeding within California is very small, and thus vulnerable to impact from falconry, although at present this species is not taken by falconers to a significant extent. Logging is another potential hazard.

Recommendations: (1) Survey to determine present breeding status and research historical status. (2) Determine if populations have actually ever been much larger than at present and reassess placement in list categories accordingly.

COOPER'S HAWK (*Accipiter cooperi*)

Status and range: The Cooper's Hawk has declined throughout California as a breeding bird. This species was once considered a common nester throughout California (Grinnell and Miller 1944). Virtually every observer contacted feels breeding populations have declined over the last two or three decades (ABF). Breeding populations have completely disappeared from some areas, such as the Colorado River (D. Gaines, pers. comm.); sharp declines have been noted in the Sacramento Valley (Gaines 1974), Santa Clara and Santa Cruz counties (Chandik and Baldrige 1969); the Santa Barbara region (P. Lehman, pers. comm.); northern San Diego Co. (A. Fries, pers. comm.); and the Yosemite region (Gaines, 1977).

Much greater numbers winter in California. These populations, after a steady decline from the early 1950's through the mid-1960's, were apparently stabilizing in the late 1960's but at a level much reduced from the early 1950's (Brown 1973).

Potential threats: Habitat destruction, mainly in lowland riparian areas, is probably the main threat, although direct or indirect human disturbance at nest sites can be equally detrimental. Illegal take of nestings is also a potential threat, especially in populated areas. This species' rapid decline in the eastern United States is probably due to pesticides (Hackman and Henny 1971; Henny and Wight 1972; Snyder et al. 1973), and it is likely that California populations have been affected to some extent. One bird taken in San Diego in 1968 was found to be highly contaminated with DDT (Risebrough et al. 1968), but two others examined by California Fish and Game Pesticide Investigations Section showed no such high contamination (W. H. Griffiths, pers. comm.), and Brian J. Walton (pers. comm.) found no evidence of pesticide contamination in the Coast Range.

Recommendations: (1) Protect riparian areas throughout California. (2) Conduct a survey of the breeding population in the state. (3) Consider limiting the take of nestlings for falconry and consider requiring that Cooper's Hawks in possession of falconers be banded by the Department, pending determination of the status of the California breeding population. Winter populations are large enough that a small number can be taken for falconry. (4) Maintain ban on use of persistent pesticides in the United States.

GOLDEN EAGLE (*Aquila chrysaetos*)

Status and range: This species was once a common permanent resident throughout the open areas of California; numbers are now reduced near human population centers, but in general, populations seem stable (Grinnell and Miller 1944, Remsen and Gaines 1973a, Stallcup and Winter 1975a, McCaskie 1975c). However, this species' natural densities are very low, its reproductive rate is very low, it is at the apex of a food chain (even including small carnivores in its diet), and its large body size makes it a tempting target (see natural history summary by Snow 1973). It is the symbol of the wilderness for many people. It thus warrants special consideration whenever involved in any land management decision. Only 500 pairs are estimated to nest in California (Thelander 1974).

Potential threats: Habitat destruction (reclamation of grasslands for agriculture), shooting, and human disturbance at nest sites are major threats. Disturbance by humans during the breeding season was found to be the major source of nest failure in other western states (Snow 1973). Pesticides do not seem to be an immediate threat (Reichel et al. 1969).

Recommendations: (1) Make cliffs with eagle nest sites off-limits to rock-climbers. (2) Enforce laws protecting this species and increase publicity on convictions. (3) Increase efforts to educate public concerning the value of raptors.

PRAIRIE FALCON (*Falco mexicanus*)

Status and range: At one time the Prairie Falcon was a common permanent resident throughout California except for the humid northwest coast and higher mountains (Grinnell and Miller 1944). Populations in the California deserts are still very high and probably close to carrying capacity, but will be negatively affected if recreational use of these lands increases at its current rate (K. Berry, pers. comm.). Around the perimeter of the Central Valley, surveys in 1969-72 showed an alarmingly low recruitment of young due to abnormally high percentage of non-reproductive pairs. Furthermore, only 50% of the traditionally occupied eyries had any pairs at all (Garrett and Mitchell 1973). Recent surveys indicate some improvement in this situation (A. Craig, pers. comm.). Status of populations in the Great Basin is poorly known. The total population within California is very small and vulnerable.

Potential threats: Pesticide residues have been shown experimentally to be capable of producing eggshell thinning and hatching failure (Enderson and Berger 1970). High levels of pesticide residues have been found in Prairie Falcons in western Canada, where there has been a 34% decline in occupancy of traditional eyries and a steady population decline (Fyfe et al. 1969). It is likely that California populations are, or were, suffering from pesticide contamination, particularly those adjacent to agricultural areas of the Central Valley. However, eggshell thinning has not occurred (L. Kiff, pers. comm.). Robbing of eyries by falconers has also taken its toll, especially near population centers (Small 1974); some eyries have had to be guarded 24 hours a day. Shooting is also a common cause of mortality, especially for juveniles (Snow 1974b). In the California desert, human activity near nest sites depressed fledgling success from 3.2 to 2.9 birds per nest (K. Berry, pers. comm.).

Recommendations: (1) Maintain restrictions on persistent pesticides. (2) Closely regulate use of this species for falconry and enforce laws concerning possession. (3) Prohibit rock-climbing and off-road vehicle activity in the vicinity of nest sites.

RUFFED GROUSE (*Bonasa umbellus*)

Status and range: Formerly a fairly common permanent resident in the northwestern corner of California, the Ruffed Grouse had become rare or had disappeared from many of the localities from which it was known by the 1940's (Grinnell and Miller 1944). Yocom (1978) plotted 63 localities from which this species had been recorded between 1954 and 1976, extending from extreme northern Del Norte Co. south to extreme southern Humboldt Co., and westward to northern Trinity Co. and southwestern Siskiyou Co. There was no indication of population change over the last 20 years, but the Ruffed Grouse remains a local and uncommon species in California.

Potential threats: Habitat alteration is the principal threat.

Recommendations: (1) Survey suitable areas in northwestern California to determine true status of this species, and reassess hunting regulations accordingly. (2) Protect suitable habitat for Ruffed Grouse populations.

SAGE GROUSE (*Centrocercus urophasianellus*)

Status and range: The Sage Grouse was formerly an abundant resident in northeastern California and south, east of the Sierra, as far as Big Pine in the Owens Valley. By the 1940's, numbers had been greatly reduced and populations fragmented (Grinnell and Miller 1944). Declines have been noted in several areas, including Sierra Co. (Cutler and Pugh 1961), Honey Lake (ABF), and Lower Klamath National Wildlife Refuge (M. Taylor, pers. comm.).

Potential threats: Over-grazing of meadows, eradication of sage brush, and other loss of habitat due to agriculture are the major threats. Over-hunting and shooting at leks (strutting grounds) were probably significant threats in early part of the century. Human disturbance at leks may be partly responsible for declines in some areas in recent years. At least one lek near Honey Lake is disrupted frequently by visiting birders and photographers, and this disruption may reduce breeding success. There has been a steady decline in the number of displaying males at this lek over the last 5 years.

Recommendations: (1) Maintain integrity of remaining expanses of sagebrush habitat, including restoration and protection from overgrazing of meadows in the vicinity of springs and streams, in northeastern California. (2) Continue to monitor population levels and productivity and adjust harvest to a level which will not adversely affect Sage Grouse populations. (3) Control disturbance by humans at leks. Signs should be posted to warn visitors that closer approach to the displaying birds may reduce mating success.

SANDHILL CRANE (*Grus canadensis*)

Status and range: Two subspecies occur in California: *G. c. tabida* as an uncommon permanent resident and *G. c. canadensis* as a locally common winterer. The former was once a fairly common summer resident in northeastern California in Modoc, Lassen, eastern Siskiyou, and northeastern Shasta counties, and was even suspected of breeding as far south as Kern Co., but the population and extent of breeding range was substantially reduced by the early 1940's (Grinnell and Miller 1944). Smaller populations still persist in these areas, totaling about 60 pairs, and these have remained stable over the last two decades (California Fish and Game data courtesy R. Lee). A few additional pairs breed in Sierra Valley, Plumas and Sierra counties (James 1977). Winter populations, composed primarily of *G. c. canadensis*, are much higher, but even these have been reduced in historical times (Grinnell and Miller 1944). For instance, it used to be a common migrant in the southern coastal area (Willett 1912), where it is now rarely recorded (J. Dunn, pers. comm.).

Potential threats: Destruction of grassy marshes within breeding range, conversion from irrigation to overhead sprinkling systems in breeding areas (A. Craig, pers. comm.), and development of open areas used for traditional wintering grounds are potential threats. Although this species is a game species in several western states, its reproductive rate is so low that it cannot withstand hunting pressure (Miller 1974). Crop depredations can be controlled in more effective ways than by hunting (Miller 1974).

Recommendations: (1) Protect breeding habitat in northeastern California. (2) Maintain habitat integrity of traditional wintering grounds in California, particularly near Thornton, the Merced Co. refuges and vicinity, and the Carrizo Plain. (3) Continue prohibition on hunting of this species in California.

CALIFORNIA GULL (*Larus californicus*)

Status and range: The California Gull breeds in California at Mono Lake (25,000 pairs in 1977; D. Winkler, pers. comm.); Goose Lake, Modoc Co. (600 pairs in 1977; D. Winkler, pers. comm.); the Klamath Basin refuges (ca. 1000 pairs; D. Winkler pers. comm.); and Hartson Reservoir, Honey Lake Wildlife Area (500-700 pairs; ABF). This species no longer breeds at Eagle Lake, Lassen Co., nor in the Sutter Basin where there is some evidence of former breeding (Grinnell and Miller 1944).

The Mono Lake colony is at least the second largest colony of this species in the world (D. Winkler, pers. comm.). Only a few pairs nested at Hartson Reservoir in 1977 and all failed (ABF).

Potential threats: Falling water levels in Mono Lake, due to demands for water by the city of Los Angeles, will cause Negit Island (where 80-90% of the state's nesting population breeds) to become connected to the mainland. The colony can not be expected to reproduce successfully after it has been exposed to terrestrial predators. Ultimately, increased salinity resulting from the falling water levels can be expected to eliminate the food supply of the gulls and of nearly a million other water birds that use Mono Lake. Mono Lake is a major staging area for immense concentrations of Eared Grebes, Wilson's Phalaropes, and Northern Phalaropes. Falling water levels at breeding localities elsewhere is a threat which has already materialized at Hartson Reservoir.

Recommendations: (1) Maintain a channel between Negit Is, and the mainland in Mono Lake to prevent access by terrestrial predators. This should be regarded only as an interim solution since the continued lowering of water levels in Mono Lake threatens the entire ecosystem there. (2) Stabilize water levels at Hartson Reservoir and other breeding localities in northeastern California. (3) Restrict human access to breeding islands.

ELEGANT TERN (*Sterna elegans*)

Status and range: Although thousands of Elegant Terns from Mexico spend the summer and fall along the California coast, the only breeding colony in the United States is in the salt work dikes at the south end of San Diego Bay where some 50-200 pairs nest (Small 1959b, 1960, 1961, 1962; McCaskie and Pugh 1964; McCaskie 1967, 1969, 1970, 1974b). Thus, with only one colony in the United States, this species is highly vulnerable to extirpation.

Potential threats: Human disturbance at breeding colony is probably the major threat. At Camp Pendleton, San Diego Co., where there are suitable nesting islands, the birds arrive in late February and early March in breeding plumage and undergo courtship and copulation, but seem to become discouraged when the area is deluged with tanks and helicopters (A. Fries, pers. comm.).

Recommendations: (1) Limit access by humans and dogs to the breeding sites in south San Diego Bay. (2) Maintain suitable nesting sites in south San Diego Bay. (3) Eliminate military maneuvers during the nesting season at the mouth of the Margarita River in Camp Pendleton. It seems very likely this species could be enticed to breed here and perhaps at other protected areas along the coast.

BLACK SKIMMER (*Rvnchops niger*)

Status and range: This species has recently invaded California. It was first recorded at the Salton Sea in 1968; by 1973 three nests had been found (McCaskie, Liston and Ripley 1974), and numbers have been increasing since then. Over 100 nests were found there in 1977 (McCaskie 1977b). Nests have been found also at the north end of the Salton Sea in Riverside Co. in addition to those in Imperial Co. (Grant and Hogg 1976). A pair nested on the salt pond dikes at the south end of San Diego Bay in 1976 (McCaskie 1976b), with three nests found there in 1977 (McCaskie 1977b). It seems likely that this species will continue its natural expansion into California if nesting sites are available and protected.

Potential threats: Human disturbance at nesting sites and rising water levels at the Salton Sea, with resulting inundation of nesting islands, are potential threats. During colony disturbance, eggs not shielded by incubating birds may be quickly destroyed by high temperatures, particularly at the Salton-Sea. Untended eggs are also highly vulnerable to gull predation.

Recommendations: (1) Limit access by humans and dogs to nesting sites at the Salton Sea and San Diego Bay. (2) Construct small islands at both localities to increase suitable nesting areas. Grant and Hogg (1976) specify that islands constructed for this purpose at the Salton Sea should be high enough that they remain above the June-July high water levels, should be kept relatively free of vegetation, and should be some distance from the nearest land. Boats should not be allowed near nesting sites.

MARBLED MURRELET (*Brachyramphus marmoratus*)

Status and range: The Marbled Murrelet presumably breeds locally along the coast from Del Norte Co. to Santa Cruz Co. in redwood-douglas fir forests. Although only one nest has ever been found in North America (Binford, Elliott, and Singer 1975), presence of calling birds at night or dawn in redwood-douglas fir groves is assumed to indicate breeding in the vicinity. Using this criterion, the following localities are believed to support breeding populations (data from ABF): Jedediah Smith Redwoods State Park (Del Norte Co.), Prairie Creek Redwoods State Park (Del Norte and Humboldt counties), Grizzly Creek State Park (Humboldt Co.), Russian Gulch State Park (Mendocino Co.), Portola State Park and Butano Creek (San Mateo Co.), and Waddell Creek and Big Basin Redwoods State Park (Santa Cruz Co.). This may be a small percentage of the actual

breeding sites; for example, no nesting locality has been discovered yet in Sonoma Co. despite the presence of numbers along the coast in summer (B. D. Parmeter, pers. comm.). Nevertheless, the total population in California is not very large, and the species seems to need nearly virgin timber for breeding, making it very vulnerable. The only places where this species nests in Santa Cruz Co. are in virgin forests, and no breeding localities have been found anywhere else in the county, almost all of which was logged during the last century (R. Morgan, pers. comm.).

Potential threats: Habitat destruction, primarily by lumber operations in the highly coveted redwood-douglas fir coastal forests, is a significant threat.

Recommendations: (1) Avoid tree-cutting near any known breeding site. (2) On public lands, survey proposed timber sale areas within the breeding range of this species, and delete, from the timber sales, areas where breeding populations are found. (3) Do a complete survey of coastal forests to inventory breeding populations. If it is verified that this species occurs only in virgin forests, it would be safe to assume that populations were formerly many times greater than at present, qualifying this species for the Second Priority List.

RHINOCEROS AUKLET (*Cerorhinca monocerata*)

Status and range: The Rhinoceros Auklet at one time bred on the Farallon Islands but had been extirpated by 1927; birds possibly breeding were noted in 1971 and 1972 (Ainley and Lewis 1974), and the first nests were found in subsequent years. Numbers have been increasing ever since (R. Stallcup, pers. comm.). An even larger colony of 50-75 pairs has recently been discovered on Castle Rock, Del Norte Co. (Osborne 1973). This species has been expanding its range in Washington and Oregon as well (Scott et al. 1974), and seems likely to continue to increase in California. Nevertheless, it is still very vulnerable; it is known to nest on only two islands, and is one of the most susceptible seabirds to oil pollution (D. G. Ainley, pers. comm.).

Potential threats: Human disturbance at nest sites and oil spills are potential threats.

Recommendations: (1) Restrict human access to Castle Rock. Boat landings should be prohibited except by authorized persons. (2) Prohibit oil-drilling near the Farallons or near Castle Rock.

BLACK SWIFT (*Cypseloides niger*)

Status and range: The Black Swift breeds very locally in four regions of California: the central and southern Sierra; the coastal cliffs and mountains of San Mateo, Santa Cruz, and Monterey counties; the San Gabriel, San Bernardino, and San Jacinto mountains of

southern California; and a limited area in the Cascade Range (Grinnell and Miller 1944; Small 1974; C. T. Collins, pers. comm.). Nests have been found only on cliffs behind or adjacent to waterfalls or steep coastal cliffs. Known nest sites are: near Yuba Pass, Sierra Co. (five or seven nests; ABF); Yosemite Valley (Grinnell and Miller 1944; Gaines 1977); Ella Falls, Kings Canyon Natl. Park (Dixon 1943); Marble Fork of Kaweah River, Sequoia Natl. Park (Dixon 1935); middle fork of Tule River near Springville, Tulare Co. (ABF); Ano Nuevo Point, San Mateo Co. (three pairs; DeSante and LeValley 1971; DeSante and Remsen 1972); Lighthouse Point, Santa Cruz Co. (one or two pairs; Chase and Chandik 1966; R. Morgan, pers. comm.); Berry Creek Falls, Santa Cruz Mountains (Smith 1928); Point Sur, Monterey Co. (10+ pairs; DeSante and Remsen 1972); Sturdevant Falls, Santa Anita Canyon, San Gabriel Mountains (two nests in 1974, McCaskie 1974b; one to three pairs in most years, C. T. Collins, pers. comm.); Big Falls, Fallsvale, San Bernardino Mountains (at least one pair; McCaskie 1969); 9 miles east of Hemet in San Jacinto Mountains (one pair; McCaskie 1969); MacArthur-Burney Falls, Shasta Co. (five nests; Cutler and Pugh 1959); Mossbrae Falls near Dunsmuir on upper Sacramento River (eight or nine pairs; Winter and Erickson 1976; Winter and Morlan 1977). Breeding is also suspected at Feather Falls, Butte Co. (DeSante and Remsen 1972, Stallcup and Winter 1975a); at McCloud Falls on McCloud River near Cattle Camp, Siskiyou Co. (M. Taylor, pers. comm.); Tahquitz Canyon, San Jacinto Mountains (J. Dunn and C. T. Collins, pers. comms.); near Black Mountain Campground, San Jacinto Mountains (A. Fries, pers. comm.); and near Hearst Castle, San Luis Obispo Co. (J. Dunn, pers. comm.). The total number of individuals breeding in California is certainly very small.

Potential threats: The inaccessibility of this species' nests sites makes it nearly invulnerable to most disturbances. Rock-climbing in the vicinity of nest sites seems to be the only likely menace. The spray-soaked rocks of most nest sites would seem to make them unattractive for climbers, but some of the waterfall nest sites dry out during summer.

Recommendation: Identify sites vulnerable to human disturbance and prohibit rock-climbing in the vicinity of these sites.

WIED'S CRESTED FLYCATCHER (*Myiarchus tyrannulus*) (= Brown-crested Flycatcher)

Status and range: The Wied's Crested Flycatcher is an uncommon summer resident in the Colorado River Valley (Banks and McCaskie 1964), and was doubtless more common before the destruction of most of the riparian woodland and mesquite brushland in the area. Outside of the Colorado River, the only breeding locality is Morongo Valley, San Bernardino Co. where one or two pairs nest (McCaskie 1970, 1971, 1973b, 1974b,

1975c). This species' preference for a habitat which is rapidly disappearing and its consequent low population size makes it vulnerable to extirpation from California.

Potential threats: Destruction of cottonwood riparian and mesquite brushland along the Colorado River is the main cause for concern. Competition with introduced Starlings for nest holes may also be a factor.

Recommendations: (1) Protect existing cottonwood riparian and mesquite brushland along the Colorado River. (2) Restore riparian habitat in the Colorado River Valley (see Gilded Flicker). (3) Initiate a Starling control program during the breeding season at Morongo Valley where this species is suffering from competition for nest sites. Such a program at Morongo Valley was very effective in 1975 (E. A. Cardiff, pers. comm.).

BLACK-CAPPED CHICKADEE (*Parus atricapillus*)

Status and range: The Black-capped Chickadee is an uncommon and local resident in riparian woodland of Del Norte Co., northern Humboldt Co, and western Siskiyou Co. (Grinnell and Miller 1944). The total population in California is small and restricted to pockets of riparian habitat.

Potential threats: Destruction of riparian habitat in northwestern California is a potential threat.

Recommendation: Protect riparian areas in northwestern California which are known to support this species.

BENDIRE'S THRASHER (*Toxostoma bendirei*)

Status and range: The Bendire's Thrasher is a fairly common summer resident in the Cima Dome-Lanfair Valley area of northeastern San Bernardino Co. (Remsen, Cardiff, and Cardiff MS), and a very sparse summer resident in the Joshua Tree Natl. Monument-Yucca Valley area of southwestern San Bernardino Co. (McCaskie 1974b). The total population within California is under 200 pairs (Remsen, Cardiff, and Cardiff MS). The Bendire's Thrasher has a rather small worldwide range and seems to be only very locally distributed within that range.

Potential threats: Harvesting of Joshua Trees or yuccas for soap products, overgrazing, off-road vehicle activity in breeding habitat.

Recommendations: (1) Protect breeding habitat in the Cima Dome-Lanfair Valley area. (2) Reduce grazing allotments in eastern Lanfair Valley where population density is very

low, probably due to extreme overgrazing. (3) Prohibit off-road vehicle activity in this species' habitat.

LE CONTE'S THRASHER (*Toxostoma lecontei*)

Status and range: The Le Conte's Thrasher is a widespread but rare permanent resident in the western and southern San Joaquin Valley, upper Kern River Basin, Owens Valley, Mojave Desert, and Colorado Desert (Grinnell and Miller 1944). Densities even in optimum habitat are five pairs or less per square mile (Sheppard 1970), an extremely low density for any passerine bird. Many areas with seemingly suitable habitat lack this species (Remsen, Cardiff, and Cardiff MS).

Populations in the San Joaquin Valley have definitely declined. Formerly breeding as far north as Coalinga, Fresno Co., on the western edge of the valley (Grinnell and Miller 1944), it is today restricted to the southwestern corner of the San Joaquin Valley in the Taft-Maricopa area.

It has a relatively small worldwide range and the total world population is probably very low compared to most passerines. California is a major population center for this species.

Potential threats: Although this species inhabits some of the most inhospitable regions in California, most of its habitat is also preferred racing grounds for the growing numbers of off-road vehicle enthusiasts. Not only is this species rare and local, but it is exceptionally wary of human beings. The impact of even a single motorcycle race through a desert wash (preferred nest sites are in large shrubs along washes) on a breeding pair of Le Conte's Thrashers must be considerable. The remnant San Joaquin Valley and, Owens Valley populations are threatened by agricultural development.

Recommendations: (1) Maintain habitat integrity in southwestern San Joaquin Valley. (2) Eliminate off-road vehicle activity in areas supporting this species, especially in desert washes used for breeding.

CRISSAL THRASHER (*Toxostoma dorsale*)

Status and range: This species was once a fairly common permanent resident in mesquite brushland and densely vegetated washes in the Imperial and Coachella valleys and along the entire length of the Colorado River Valley in California (Grinnell and Miller 1944). Today the Imperial and Coachella valley populations have been reduced dramatically by removal of mesquite brushland and conversion of desert to agricultural fields. Colorado River populations have also declined but are still high in some areas. Again, removal of mesquite brushland and replacement of mesquite by introduced tamarisks is responsible. There are also small populations scattered elsewhere in the Colorado and Mojave Deserts

West to Anza-Borrego State Park and Morongo Valley and north to Shoshone, Inyo Co. These populations tend to be small and very local.

Potential threats: Habitat destruction through removal of mesquite brushland for agriculture or replacement of mesquite by introduced tamarisks are the major threats in the Coachella, Imperial, and Colorado River valleys. Off-road vehicle activity in large washes with densely vegetated borders is the main threat to populations elsewhere in the deserts; in addition to actual physical degradation of wash habitats by off-road vehicles, the impact of loud noise on this shy species is probably considerable.

Recommendations: (1) Protect mesquite brushland in the Coachella, Imperial, and Colorado River valleys (2) Control tamarisks invading mesquite brushland in the Coachella, Imperial and Colorado River valleys. (3) Protect large washes with dense, brushy borders in the Colorado and Mojave deserts. (4) Eliminate off-road vehicle activity in large washes with dense, brushy borders in the California deserts.

VIRGINIA'S WARBLER (*Vermivora virginiae*)

Status and range: The Virginia's Warbler is a rare and local summer resident along the Nevada border. Only a few scattered breeding localities are known: Wyman Canyon, White Mountains, Inyo Co. (McCaskie 1967); east side of Monitor Pass, Mono Co. (one pair; Winter and Erickson 1976); and Clark Mountain, San Bernardino Co. (two or four pairs; McCaskie 1974b, 1975c). This species has recently expanded its breeding range into the San Bernardino Mountains (Johnson and Garrett 1974): one pair has bred at Green Spot Picnic Area (McCaskie 1976b), and other likely breeding localities are Arrastre Creek and the South Fork of the Santa Ana River.

Potential threats: Habitat destruction (unlikely except by forest fire) is a potential threat.

Recommendations: Maintain habitat integrity at breeding localities.

HEPATIC TANAGER (*Piranga flava*)

Status and range: The Hepatic Tanager has only recently expanded its range to include California (Johnson and Garrett 1974). Only four breeding localities are currently known, all in San Bernardino Co.: Clark Mountain (one or two pairs; Johnson and Garrett 1974; McCaskie 1975c, 1976b); the Kingston Range (three pairs; McCaskie 1977b; Cardiff and Remsen MS); the New York Mountains (one pair; McCaskie 1977b; Remsen, Cardiff, and Cardiff MS); and Arrastre Creek, San Bernardino Mountains (one pair; Johnson and Garrett 1974). The total population in California is very small.

Potential threats: Habitat destruction of white fir, pinyon areas on the desert peaks is unlikely, except by forest fires. 'Habitat destruction and disturbance by humans are potential threats at Arrastre Creek; the area is used by target shooters, motorcycle clubs, and general picnickers, and the Hepatic Tanager is a very shy, wary species.

Recommendations: (1) Discourage overnight camping and prohibit use of firearms in the Arrastre Creek area. (2) Maintain habitat integrity of desert peak white fir groves. Although total control of forest fires is undesirable, it would be tragic to lose these relict forests with their unique avifaunas and importance to the study of island biogeography (Ned K. Johnson, in prep.); the Bureau of Land Management Cima Fire Station should be especially sensitive to fires near these areas.

CARDINAL (*Cardinalis cardinalis*)

Status and range: At present, the Cardinal is known only from the vicinity of Earp, San Bernardino Co. on the Colorado River (McCaskie 1974c, 1976b). Although reports have been more frequent and widespread in the past than at present, this species has apparently never been widespread in the Colorado River Valley, and it is not known for certain that it breeds every year in California.

Potential threats: Destruction of mesquite brushland and cottonwood riparian and replacement of mesquite by introduced tamarisks are potential threats.

Recommendations: (1) Protect mesquite brushland and adjacent riparian areas in the Colorado River Valley, especially near Earp. (2) Control tamarisks in the Colorado River Valley. (3) Restore riparian woodland in Colorado River Valley (see Gilded Flicker).

GRAY-HEADED JUNCO (*Junco caniceps*)

Status and range: The Gray-headed Junco is a rare and local breeder along the Nevada border. Only a few breeding localities are known (and it is not common at these localities): White Mountains, Grapevine Mountains, and Clark Mountain (Grinnell and Miller 1944).

Potential threats: Habitat destruction by forest fires in breeding areas is a potential threat.

Recommendation: Maintain habitat integrity of breeding areas.

OTHER CANDIDATES

Species listed below were proposed for the special concern list by two or more persons, but were not included at the present time for the reasons indicated. An asterisk (*) indicates species included on the National Audubon Society Blue List (Arbib 1977).

*WESTERN GREBE: possibly declining, but further information needed on population trends and current populations.

GREEN HERON: possibly declining in some areas, but seems to be holding its own overall.

WOOD DUCK: has declined in some areas, but more information is needed on current population levels and trends.

REDHEAD: California populations may be on the decline (R. L. Gray, pers. comm.); more data needed.

RING-NECKED DUCK: should probably be on Third Priority List, but more information is needed on current population of breeding birds.

*CANVASBACK: perhaps should be on Third Priority List, but more information is needed on status of breeding population in California.

BUFFLEHEAD: perhaps should be on Third priority List, but more information is needed on status of breeding population in California.

*RED-SHOULDERED HAWK: thought to be holding its own or expanding in most of California (Wilbur 1973; cf. Wiley 1975). This species has shown dramatic declines in the eastern U. S. (Henny et al. 1973), and should be watched.

*FERRUGINOUS HAWK: never proven to breed in California, but reduction of wintering populations from historical levels should perhaps warrant placement on Special Concern List.

AMERICAN KESTREL: several observers report striking declines of this species as a breeding species in their areas; should be watched, but still too common in most areas to be of special concern.

BLUE GROUSE: has declined in some parts of its range, especially in southern California. Status of the endemic race *howatdi* needs clarification (Abbott 1965).

FORSTER'S TERN: the colonial nature of its breeding system and the limited number of suitable nesting areas does make this species rather vulnerable; further information on number and size of colonies in California and on historical trends are needed. This species has increased as a breeding bird in southern California since the work of Willett (1912). CASPIAN TERN: (same comments apply as for Forster's Tern).

BLACK TERN: populations at times have been very low, but at present seems to be holding its own.

GREATER ROADRUNNER: numbers have definitely declined in parts of northern California, but populations in its stronghold in southern California are doing well.

WHIP-POOR-WILL: almost certainly breeds in small numbers in the San Jacinto Mountains, San Bernardino Mountains, and on Clark Mountain, but there is still no direct evidence for nesting; when this is obtained, this species should be placed on the Third Priority List.

BROAD-TAILED HUMMINGBIRD: shares distribution pattern in California with Gray-headed Junco and Virginia's Warbler, but this species seems much more common and widespread within that range than the junco or the warbler.

BLACK-BACKED THREE-TOED WOODPECKER: a scarce species, but probably widely distributed and doing well within its range.

*LEWIS' WOODPECKER: declines have been reported in some areas; more information needed on population status and trends.

TREE SWALLOW: has apparently disappeared from much of southern California as a breeding species; further information needed on population size and trends in northern California.

GRAY JAY: too widespread to be considered of special concern despite its low densities within its range.

YELLOW-BILLED MAGPIE: populations have declined in the southern coastal area where formerly a common resident (Willett 1912), but population trends elsewhere are unknown. Since this species is endemic in California, it should be watched with care.

BLUE-GRAY GNATCATCHER: apparently heavily parasitized by cowbirds in several areas and declining in those areas- should be watched.

WATER PIPIT: although known to be breeding only in a couple of localities in the alpine zone of the Sierra Nevada, it is being reported from more and more localities during the summer months and will probably be found to breed the length of the Sierra.

LUCY'S WARBLER: populations have declined along the Colorado River; at one time "numerous" in the mesquite brushland adjacent to the river (Grinnell 1914), it had virtually disappeared by the late 1950's (Monson 1959, 1960), but apparently has recovered to the point at which it may be considered fairly common where suitable habitat remains; however, its mesquite brushland habitat is disappearing rapidly; this species has been expanding its breeding range elsewhere in the California desert.

COMMON YELLOWTHROAT: has declined sharply in the Central Valley, but populations in the rest of the state are apparently doing well. Perhaps the endemic race *sinuosa* deserves placement on Second or Third Priority lists, since the total world population is probably under 200 pairs (Foster 1977). Vulnerable to cowbird parasitism.

BOBOLINK: it is likely that this species was once a regular breeder in Modoc Co., but documentation is lacking. Although no nest was ever found, this species undoubtedly nested in some years. Skeptics should consult Maillard (1924) and note that this species is a common breeder at Malheur National Wildlife Refuge about 100 miles northeast of the California-Oregon border.

TRICOLORED BLACKBIRD: De Haven et al. (1975) estimated that in the 35 years prior to 1972, the Central Valley population of this species had declined, perhaps by more than 50%." Further study is needed to determine whether this decline is continuing, particularly since this species is virtually endemic to California and is a potentially vulnerable, colonial breeder. BLUE GROSBEAK: although declines have been noted in the San Joaquin Valley (ABF) and southern California (Willet 1912), this is a common species in many areas and may even benefit from conversion of virgin riparian woodland to the early successional stages of riparian woodland (DeSante and LeValley 1971).

ABERT'S TOWHEE: numbers have declined due to destruction of mesquite brushland around the Salton Sea and Colorado River Valley, but not to the point warranting special concern.

*GRASSHOPPER SPARROW: although a rare and local species, this seems to be the true nature of this species throughout much of its range; there is no indication of any population decline, except perhaps in the southern coastal area, and birders seldom visit this species' habitat to assess its true status. On the surface, it appears to have virtually unlimited habitat available in the foothill grasslands of California wherever grazing is not severe and a few scattered bushes mingle with the grassland.

DISCUSSION

From the previous accounts, it is clear that many of the current problems facing California's avifauna can be dealt with by focusing efforts on a few key problems and critical areas. At the top of the list is habitat preservation of riparian woodland and freshwater marshes. Colorado River riparian woodland is the habitat in the greatest danger of disappearing from California. Only a few small remnants remain, and as a consequence, 13 species of special concern (plus Yellow-billed Cuckoo) are restricted to or found in Colorado River riparian woodland or adjacent mesquite brushland. Conservation of existing remnant riparian areas and mesquite brushland, restoration of riparian woodland, and control of introduced mammals should be top priority items in the overall plan to guarantee the future of California's avifauna.

Riparian woodland in the Central Valley also contains a significant number (six) of species on the special concern list (plus Yellow-billed Cuckoo) and should receive special attention, particularly in the southern San Joaquin Valley, where little habitat remains. Riparian habitat throughout California is badly in need of protection. Other especially important riparian areas are along the Otoy, San Luis Rey, Santa Ana, Mojave, Amargosa, Owens, Carmel, Pajaro, Susan, and Klamath rivers.

Freshwater marsh is another habitat rapidly disappearing and desperately in need of protection throughout the state. Six species are of Special Concern because of the disappearance of freshwater marsh habitat. Coastal southern California and the San Joaquin Valley are two areas which have very limited freshwater marsh habitat, and immediate conservation efforts should be directed towards these regions.

Islands, both in the ocean and in freshwater, are also extremely important to the future of California birds. These are critical breeding sites for colonial waterbirds, of which there are 11 on the special concern list, and many more would be added if further deterioration occurs. The two islands most critical to California seabirds are Castle Rock near Crescent City and the Farallon Islands. As for freshwater islands, those in the Klamath basin refuges and on Hartson Reservoir are perhaps the most critical, although at the moment, Negit Island in Mono Lake is the most jeopardized.

An example of extreme habitat destruction is the case of Buena Vista Lake in the southern San Joaquin Valley. Here three of the habitats mentioned above, freshwater marsh, freshwater islands with colonial waterbirds, and riparian woodland, were all present. To those who have visited Buena Vista Lake subsequent to its draining, Linton's (1908) account of the lake will bear no resemblance to the current situation. Linton listed Black Tern, Western Grebe, Double-crested Cormorant ("immense numbers"), and White Pelican (750 nests) as "common" breeders. Snowy Plovers were also nesting and White-faced Ibis and Fulvous Whistling-Ducks were seen. Adjacent riparian areas supported the following breeding birds: Yellow-billed Cuckoo ("fairly common"), Willow Flycatcher ("common"), Bell's Vireo ("common"), Yellow Warbler ("common"), Yellow-breasted Chat ("common"), and Blue Grosbeak ("fairly common"). A visitor in 1978 would probably not find any of these species. A similar history befell Tulare Lake, which supported a similar avifauna. The San Joaquin Valley in general has been devastated to an extent unparalleled elsewhere in California. Today's familiar panorama in the southern portion of the valley is that of enormous cultivated fields from horizon to horizon, so meticulously maintained that not a weed remains even along the roadsides. Biological diversity in these areas is as low as the most sterile portions of the California desert. Breeding bird diversity and density is probably lower only in alkali desert lake beds and sand dunes. What wildlife habitat is left in the San Joaquin Valley needs attention desperately.

Although the Brown-headed Cowbird is a native species, the expansion of agriculture in California has resulted in a phenomenal increase in cowbird populations and significant range expansions. At the same time, populations of its favorite hosts have been decreasing due to habitat destruction. If the Brown-headed Cowbird were specialized on

these few hosts such as Bell's Vireo, Yellow Warbler, and Willow-Flycatcher, there would be no problem, since as the host populations declined, so would the cowbirds. But the Brown-headed Cowbird parasitizes virtually every species with an accessible nest, and its population continues to increase as its favored riparian woodland hosts decrease. The reason the impact of cowbird parasitism is so great on these small insectivores is that a cowbird nestling destroys or out-competes all of its host's tiny nestlings, so the host's reproductive output is zero; but in larger hosts such as Red-winged Blackbird, the presence of a cowbird nestling usually reduces the reproductive output by one nestling, since the nestlings are more similar in size. The Brown-headed Cowbird at present is threatening the Bell's Vireo, Willow Flycatcher, Yellow Warbler, Common Yellowthroat and Warbling Vireo in some areas, probably the Yellow-breasted Chat, and possibly Black-tailed Gnatcatcher, Blue-gray Gnatcatcher, and Gray Vireo. Virtually all of California's vireos, warblers, and small flycatchers may be in trouble if the cowbird population continues to increase and expand its range. It is now found in the higher Sierra Nevada and remote desert mountain ranges, and will probably continue to expand its range. The effect on the total ecosystem of the loss of these formerly numerous insectivores would probably be considerable. It is time that methods of cowbird control be investigated and implemented, including the feasibility of population control through eradication of large numbers at winter roosts.

The Starling, an introduced species, is currently threatening at least two species of special concern, the Purple Martin and the Gila Woodpecker. It may pose problems for other hole-nesters as its population continues to increase. Potential victims are Wied's Crested Flycatcher, Ash-throated Flycatcher, Western Bluebird, Violet-green Swallow, Tree Swallow and all woodpeckers. Research into methods of Starling control would be a worthwhile investment.

Biologists should not be permitted to undertake raptor nest studies that involve repeated handling of large numbers of nestlings because such handling can produce fledglings with less fear of humans, and consequently with a significantly lower survival rate, than that of nonhandled fledglings (Snyder and Snyder 1974).

California breeding populations of at least five raptors are currently at levels sufficiently low that removal of birds for falconry must be closely regulated. Falconry probably has little impact on raptor populations as a whole, but when a population is greatly reduced due to pesticide contamination and/or habitat loss, a moratorium should be imposed on taking any of the remaining population for falconry. Raptors, at the apexes of food chains, are less common and have a naturally lower reproductive rate than many bird groups, thus they are particularly vulnerable to removal of individuals from the population. For this reason, utmost care must be taken both in monitoring raptor populations and in regulating their use for falconry.

ACKNOWLEDGMENTS

I would like to thank the following people for their criticisms of an earlier draft and providing much needed information for inclusion in the species of special concern list: David G. Ainley, Stephen F. Bailey, Robert A. Barnes, Laurence C. Binford, Ronald Branson, Eugene A. Cardiff, Steven W. Cardiff, Jerry Cawthon, Ted Chandik, Charles T. Collins, John B. Cowan, Alan M. Craig, John Dunn, Bruce G. Elliott, Dick Erickson, Alice Fries, David A. Gaines, Kimball Garrett, Gordon Gould, Randall L. Gray Robert B. Hansen, Tom Heindel, H. Lee Jones, Ronald M. Jurek, Lloyd F. Kiff, Betty Kimball, Al Lapp, Steve Laymon, Paul Lehman, Ronald LeValley, Leon Littlefield, Tim Manolis, Guy McCaskie, L. Richard Mewaldt, Mabel E. Mires, Randy Morgan, Joe Morlan, Gary Page, Benjamin D. Parmeter, William M. Pursell, R. B. Reno, Don Roberson, Doris M. Shanks, Arnold Small, Richard Stallcup, Bob Stewart, G. Shumway Suffel, Michael J. Taylor, E. Wayne Tillay, Philip Unitt, John S. and Ricky Warriner, Dave Winkler, and Vernal L. Yadon. The reviews from Binford, Dunn, Erickson, Gaines, Hansen, Morlan, and Stallcup were particularly helpful. I would also like to thank Dick Erickson and Joe Morlan for access to the American Birds files for the Middle Pacific Coast Region. I am grateful to Linda Hale for help with the literature search. Finally, Alan Craig was exceptionally helpful with all aspects of this paper, and I am deeply grateful for all his patience and aid.

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