

**State of California
The Resources Agency
California Department of Fish and Game**

A Review of the Status of the Bank Swallow (*Riparia riparia*)

by

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A REVIEW OF THE STATUS OF THE
BANK SWALLOW (Riparia riparia)

INTRODUCTION

On July 19, 1988 the Department of Fish and Game submitted a petition to the California Fish and Game Commission to list the Bank Swallow as a Threatened bird species. On August 25, 1988 the Commission accepted the Department's petition and noticed the Bank Swallow as a candidate species as provided in the California Endangered Species Act. This action initiated a maximum 12 month review process during which the Department is required to produce a written report, based on best available scientific information, which provides the following information to the Commission: 1) that the petitioned action is warranted, 2) location of habitat essential to the continued existence of the species, and 3) recommendations for management and other activities needed in order to effect recovery of the species. This report provides the above information. The Department's analysis of habitat condition and status of populations is based on recent scientific information gathered by biologists working under contract to the Department of Fish and Game. Findings of reports on the status of Bank Swallow populations on the Sacramento River and at other locales statewide (Humphrey and Garrison 1987, Laymon et al 1988) form the basis for the petitioned action.

RECOMMENDATION

The Department finds that the Bank Swallow meets the criteria set forth in Section 2067 of the Fish and Game Code and recommends that the species be listed as a Threatened bird.

REASONS FOR RECOMMENDATION

Summary of Status

The Bank Swallow (Riparia riparia) has been recorded in the lowlands of California since ornithologists began to explore these areas in the mid-nineteenth century (Grinnell and Miller 1944). Newberry (1857) considered the species to be common throughout California during his era. Bank Swallows are now considered by field ornithologists to be locally common only in certain restricted portions of the state where sandy, vertical bluffs or riverbanks are available for the birds to construct their nest burrows in colonies. In 1978 the Bank Swallow was listed as a second priority species of special concern (Remsen 1978). This status was given based on a decline in range and population levels. Remsen (1978) reported that "Channelization of rivers is the most insidious, long-term threat to the species; almost all colonies in the Sacramento Valley will be destroyed by planned bank protection projects by the Army Corps of Engineers." In 1985, Corps riprap projects destroyed at least three large nesting colonies during the breeding season causing the loss of all reproduction of these sites (Calif. Dept. of Fish & Game, unpublished data). During the study contracted in 1986 (Humphrey and Garrison 1987) it was found that nesting habitat for over 55% of the Sacramento River's Bank Swallow population could be destroyed within 5-10 years if currently proposed riprapping projects are completed (Figures 1 and 2). They also showed that 90% of the

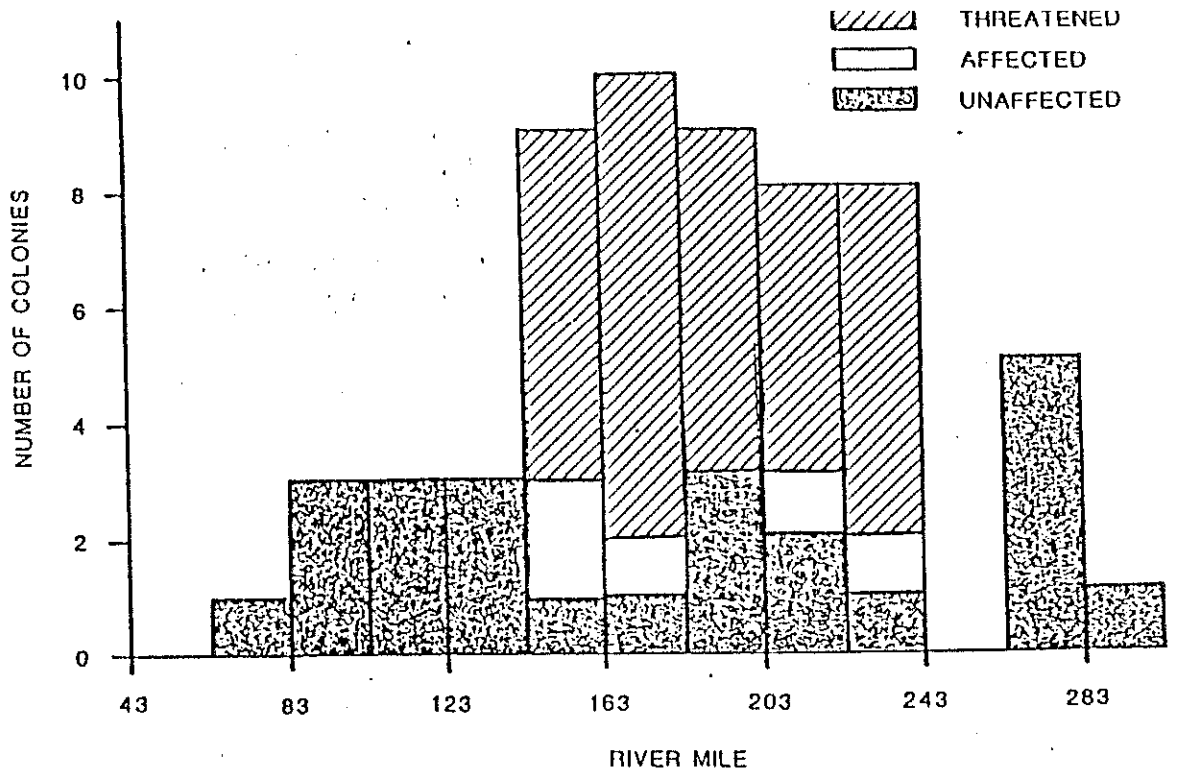


Figure 1. Geographic distribution of 60 Bank Swallow Colonies located on the Sacramento River, 1986, denoting colonies threatened, affected, or unaffected by proposed State and Federal bank stabilization projects from RM 143-243.

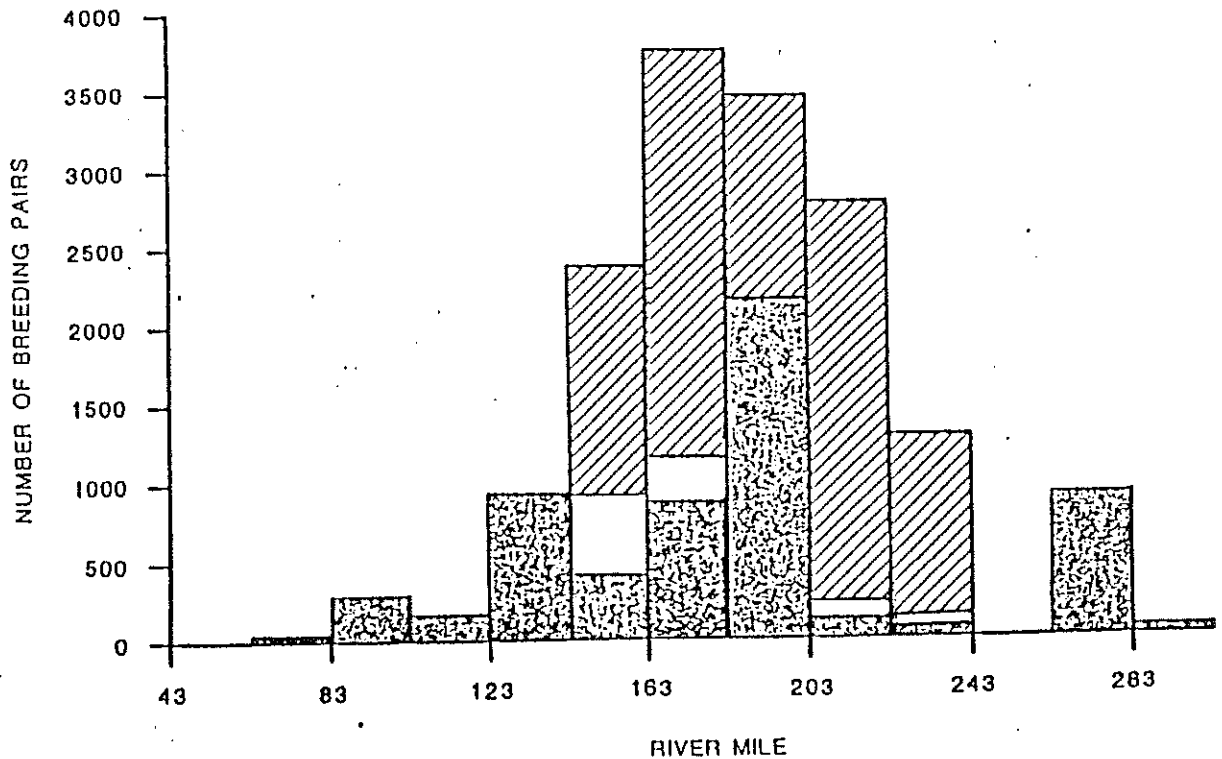


Figure 2. Geographic distribution of Bank Swallow population (estimated 16,150 pairs) on the Sacramento River, 1986, denoting breeding pairs threatened, affected or unaffected by proposed State and Federal bank stabilization projects from RM 143 to RM 243.

1/ Based on currently available proposed project data from the U.S. Army Corps of Engineers, Sacramento.

nesting habitat could be lost because of the location of these colonies on the eroding river banks that the Corps often targets for riprapping.

Range Contraction and Population Decline

The overall range of Bank Swallows in California has decreased by 50% since the turn of the century (Laymon et al 1988; Figure 3). This range contraction undoubtedly corresponds to a population decline. In addition, future population declines are certain if further habitat is removed. Bank Swallows have been totally extirpated from a region where they were historically quite common. Reasons for the disappearance of Bank Swallows in the South Coast region are not precisely known; however, the growth of human populations and urban expansion probably contributed to the demise of the species. Virtually every river and natural waterway has been converted to concrete flood control channels and the hoards of beachgoers and other associated human activities make the area uninhabitable for the species. The bluffs on the shores of man-made reservoirs are the only sites that could now support active colonies in this region.

Isolation of Remaining Population

A total of 111 colonies, consisting of 45,045 burrows were located in California during a 1987 survey conducted during spring and summer (Laymon et al 1988; Table 1). Seventy-five percent of the burrows (burrow counts are representative of the level of nesting activity) were located in the Sacramento Valley region while 21% were found in the Great Basin and Mono-Inyo regions, and 4% were found along the North and Central Coast regions. Bank Swallows have been completely extirpated from southern California. The majority of the population that remains in California is now centered in the Sacramento Valley along the Sacramento and Feather rivers.

Habitat Destruction in Remainder of Range

There have been documented losses of colony sites on the Sacramento River since 1975 due to riprap installation. Riprap is a persistent and serious threat to colonies on the Sacramento River because of projects proposed by the U.S. Army Corps of Engineers and California State Reclamation Board. Humphrey and Garrison (1987) projected a potential loss of over 50% of the colonies on the Sacramento River if all presently proposed riprap projects are carried out. As more colony sites and potential habitat on the Sacramento River are removed, declines in the largest remaining population of Bank Swallows in California are certain to occur.

Uniqueness of Remaining Habitat

The Sacramento River system includes a vast flood plain extending southward from Redding (River Mile (RM) 293) to Colusa (RM 143). Most of California's current population of Bank Swallows is concentrated on this alluvial plain where the river still meanders in a mostly natural state (Figures 4 and 5). In this upper alluvial plain, the river system has provided both the erosion and soil types needed for prime nesting habitat. Upstream from Red Bluff (RM 243), suitable habitat appears marginal, and is absent north of Redding (RM 293). South of Colusa, the colonies are small and scattered primarily in pockets of levee erosion and riprap washouts. Suitable habitat is absent south of RM 81, where the river is almost entirely riprapped.

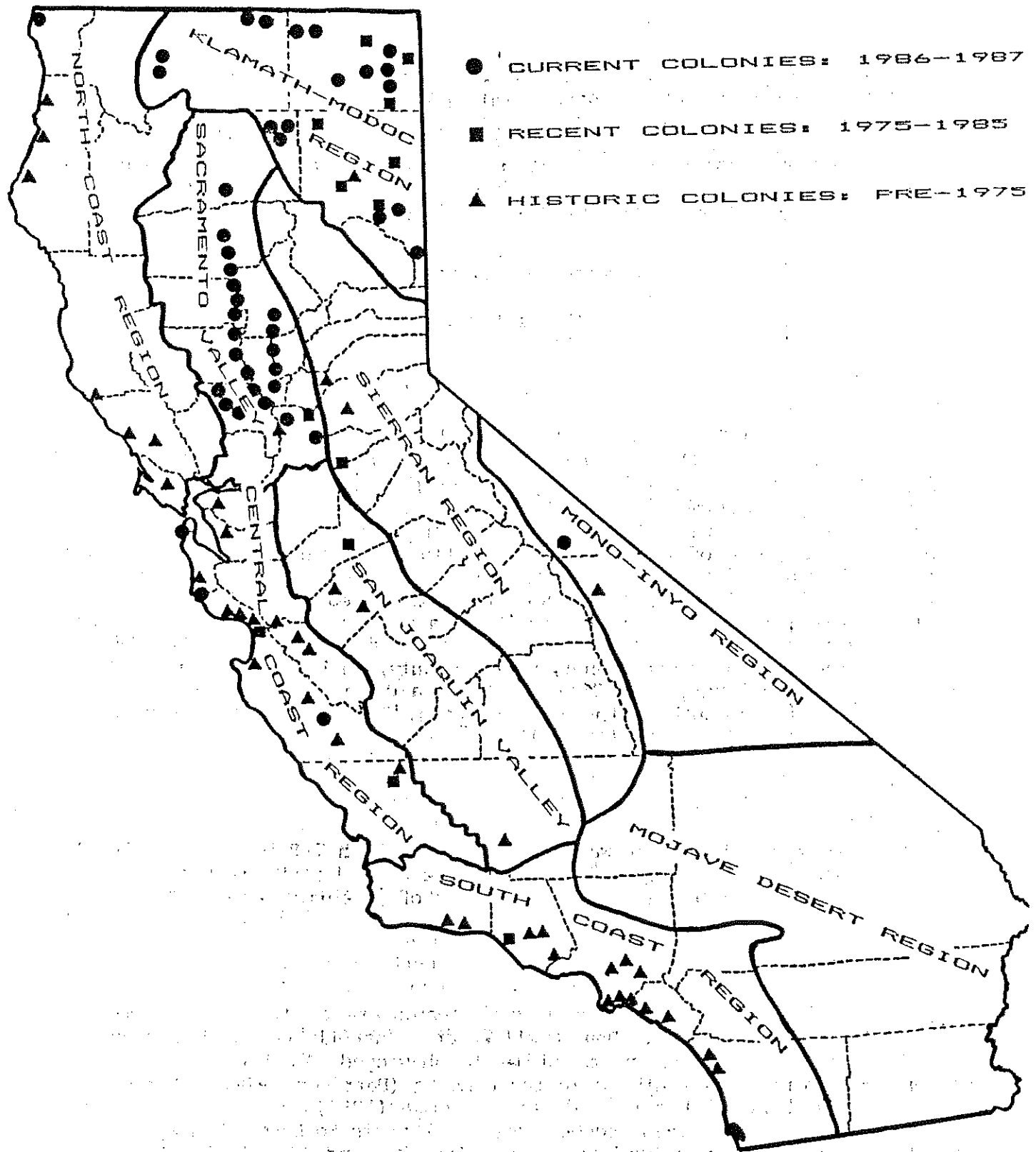


Figure 3. Historic and current breeding location of Bank Swallows in California.

Table 1. Bank Swallow population distribution by geographic regions in California, 1987.

Geographic Region	Number of Colonies	Percent of Total	Number of Burrows	Percent of Total
NORTHERN COAST	1	0.9	702	1.6
GREAT BASIN	27	24.3	7,395	16.4
SACRAMENTO VALLEY	79	71.2	33,696	74.8
SIERRAN	—	—	—	—
CENTRAL COAST	3	2.7	942	2.1
SAN JOAQUIN VALLEY	—	—	—	—
MONO - INYO	1	0.9	2,310	5.1
SOUTH COAST	—	—	—	—
MOJAVE - COLORADO DESERT	—	—	—	—
Total	111	100.0	45,045	100.0

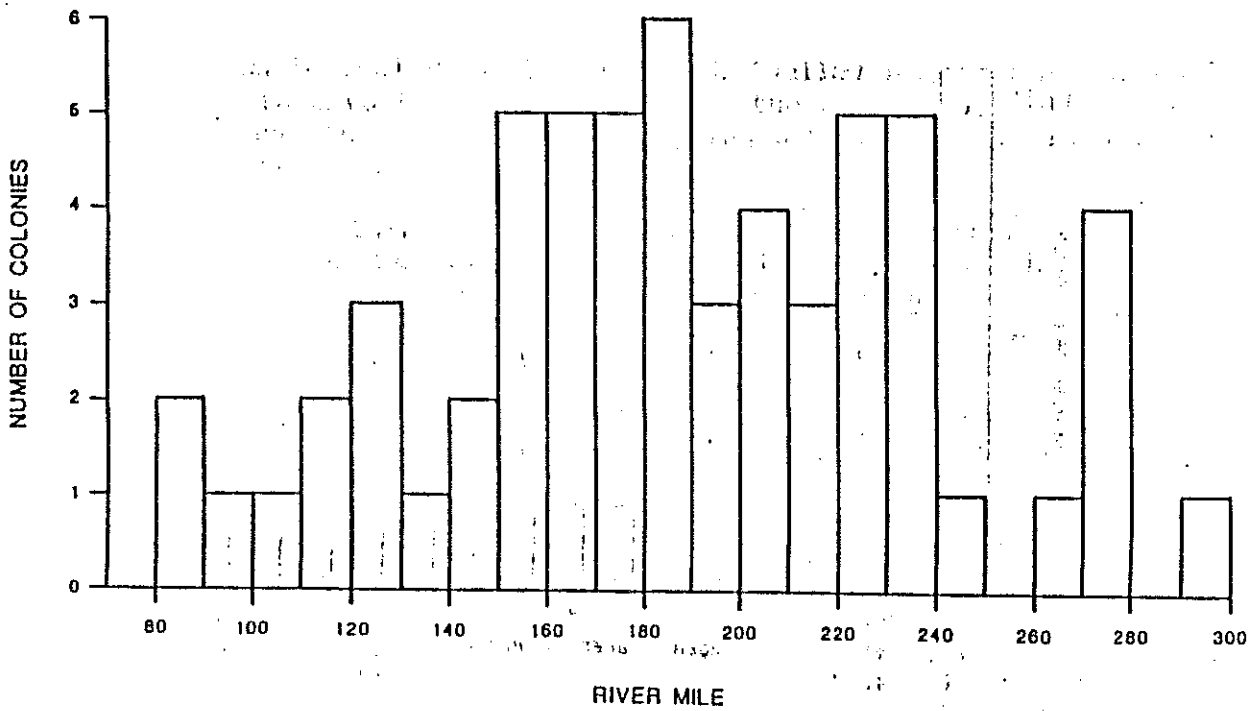


Figure 4. Geographic distribution of 60 Bank Swallow colonies by 10-river mile sections located on the Sacramento River, 1986.

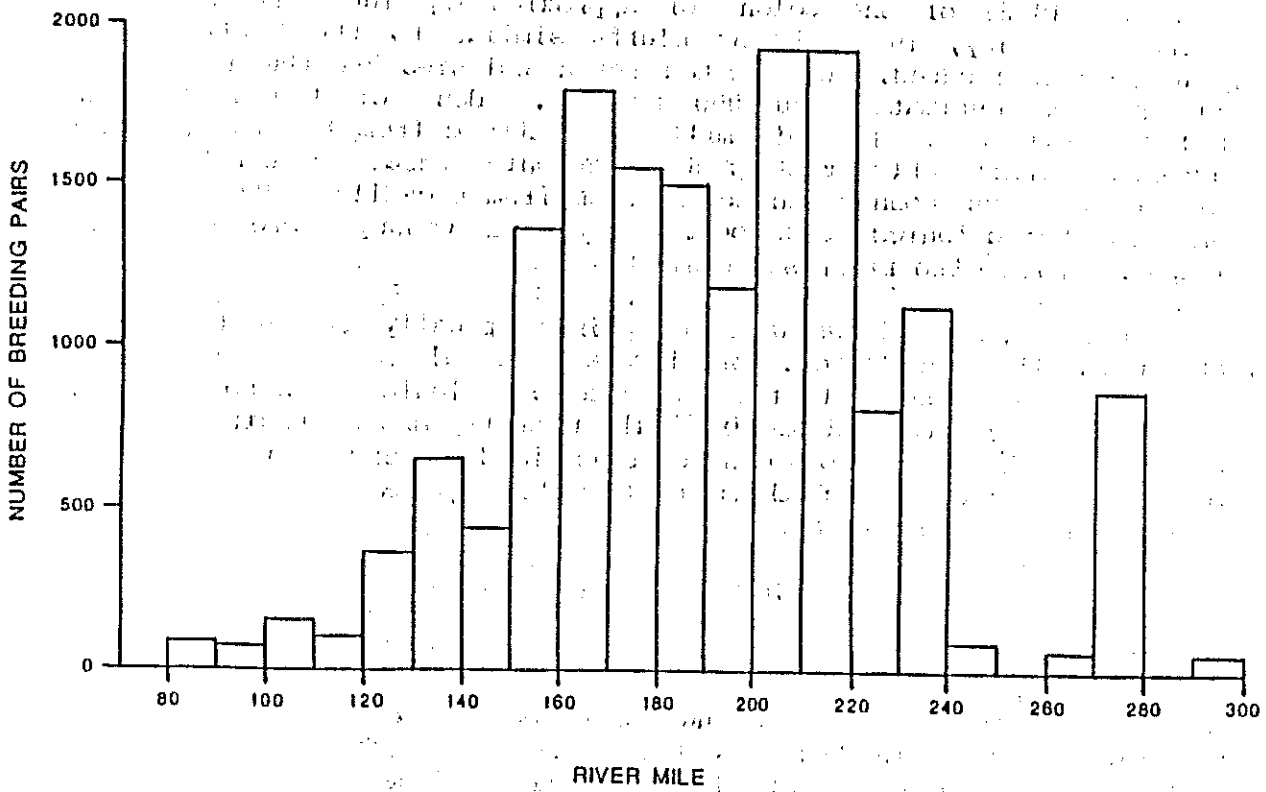


Figure 5. Geographic Distribution of Bank Swallow population (estimated 16,150 pair) by 10-river mile sections on the Sacramento River, California, 1986.

The paucity of colonies along many tributaries is evidence of the lack of appropriate habitat. This is primarily due to coarser soils and the lack of deep water below the colony throughout the summer. The Feather River is the tributary most like the Sacramento River and could be expected to produce the most additional colonies.

The riparian portion of the Sacramento River, from RM 243 to RM 143, is the only major stream bank area in California with the proper combination of suitable soils and erosion which provides appropriate habitat for Bank Swallows. Bank Swallows and natural river systems are closely interconnected. Most of the southern California streams and rivers have been channelized and Bank Swallows are no longer found breeding there. The Bank Swallow is also extirpated from the San Joaquin River. While natural lowland rivers were once common throughout the State, much of the riparian areas in California have been eliminated by various human activities, including flood control and bank protection. The remaining population of Bank Swallows along the Sacramento River is unique.

Past and Projected Habitat Loss From Bank Protection Activities

Habitats along the Sacramento and Feather rivers currently support the majority of Bank Swallows in California. In the vicinity of Sacramento where historic populations existed but none are now found, population declines have currently taken place. Flood control and bank stabilization projects have resulted in an extensive system of levees and riprapped banks which undoubtedly resulted in losses of habitat.

Bank protection under the Sacramento River Bank Protection Project (SRBPP) has resulted in the installation of almost 133 miles of riprap since Congress authorized the project in 1960 (Jones and Stokes Associates, 1987). To date, the percentage of Sacramento River riverbanks riprapped under SRBPP is 38% between Collinsville and Sacramento, 35% between Sacramento and Colusa, and 28% between Colusa and Chico Landing. If all riprap that is proposed under SRBPP is completed and added to that which already exists these percentages will increase to 75%, 60%, and about 50%, respectively. Translating past losses of Bank Swallow habitat to actual losses of Bank Swallow populations as a result of these projects is difficult without historical colony locations and sizes. However, in 1987, one contract of SRBPP destroyed 4 known colony sites, and another SRBPP contract destroyed 1 known colony site in 1986. One of the largest remaining colonies in California was riprapped in 1988. A large colony of over 2000 burrows 2.4 km (1.5 miles) downstream from the Red Bluff Diversion Dam was destroyed by a Corps riprap project in 1980 (Laymon pers. obs.) and three other large colonies near Chico and Butte City were destroyed during 1985 (Calif. Dept. of Fish and Game unpublished data). Given past and current circumstances relative to Corps activities on the Sacramento River, it is certain that other Bank Swallow colonies have been destroyed by bank stabilization projects in the past and will likely be destroyed by future projects.

Additional Threats to Habitat and Population

A colony at Woodson Bridge State Recreation Area (RM 218.6) was one of the two largest colonies, representing 11% of the total Sacramento River population in 1986. An experimental bank protection method, known as palisading, was employed there in August, 1986 after the breeding season was concluded. The integrity of the bank face remains, and the colony site was not destroyed. However, the

colony declined by 2/3 in 1987 and was abandoned by 1988. It may be that the pilings and webbing of the palisading now perpendicular to the bank may change the immediate colony environment by allowing easier access by predators (by creating new perches) and interfering with the normal flocking patterns of birds at the nesting colony. In addition, if bank erosion at Woodson Bridge is curtailed, the suitability of the bank will decline through time as the bank face becomes less vertical. Blem (1979) has demonstrated that when this happens, predation increases and Bank Swallow colonies decline, and these sites are eventually abandoned. This is what may have happened at the site in question; however, further monitoring will be needed to confirm this speculation. Experimental techniques such as palisading may be effective in controlling erosion, may be more visually pleasing and may provide habitat for some later successional stage riparian species. However, these techniques do not take into account the needs of bank nesting species such as the Bank Swallow. Stream stabilization projects, be they traditional riprap or some other technique such as the palisade, are simply not compatible with Bank Swallows, since the habitat creating forces of erosion cease to exist.

In 1987, the Lake Crowley colony, Mono County, had 2310 burrows divided among 15-16 subgroups at four separate locations around the shore of the lake. The cliff where the primary colony was found, was 40 to 50 ft in height with most nests 20 to 30 ft above the lake level. Water level was lower than normal in 1987 and many of the remaining small burrow groupings were in the eroded sediments below the normal high water level. Plans by Los Angeles Department of Water and Power to increase the reservoir's capacity and raise the lake level an additional 20 feet above the present maximum lake level threaten most if not all subgroups of this population (D. Gaines pers. comm.).

Pacific Gas and Electric Company has plans to install bank protection at several points on Lake Britton Shasta County, to protect Native American cultural sites (M. Jenkins, pers. comm.). Bank protection could impact the two Bank Swallow colonies in this area. An earthen levee bordered much of the Scott River and several points along the river were riprapped. The colonies on Hat Creek and Fall River Mills are on road cuts which have relatively high levels of human disturbance. Excavation, road maintenance, or actions of a private landowner could possibly result in loss of these colonies.

The colony at Fall River Mills, Shasta County, is one of the largest colonies in the state with over 1300 burrows counted in 1987. The colony exists on a road-cut on private land. The landowner considers the birds to be a nuisance and has plans to discourage their breeding in 1989.

Water releases by the Bureau of Reclamation threaten Bank Swallow colonies on the Sacramento River. There was a large section of riverbank inhabited by Bank Swallows at RM 195.0 (left) on the Sacramento River that collapsed in May, 1988, destroying approximately two-thirds of the colony. The colony lost 624 of 907 burrows with the bank collapse. Most nests were completely destroyed, several nest chambers exposed, and abandoned eggs and dead nestlings evident. A similar occurrence happened on Miller Creek below the Miller Diversion Dam in June, 1988 when rising water levels flooded the colony there. Project operations may have been a factor in both instances.

ESSENTIAL HABITAT

Bank Swallows require a vertical earthen or sandy substrate of a certain texture

and moisture content suitable for excavation of their nesting burrows. River banks such as presently exist in portions of the Sacramento River, certain sea cliffs, and sand and gravel quarries fulfill this requirement in California. The most extensive area such habitat exists is on the upper Sacramento River.

Except for a sandstone bluff at RM 280, all Sacramento River Bank Swallow colonies have been found in recently eroded vertical riverbanks. Bank Swallows have shown a preference for the outer curves of the river bank where erosion is heaviest. Forty four (73.3%) of 60 colonies located in 1986 were found on outer bend, 9 (15.0%) were on straight reaches of the river, and 7 (11.6%) were on inner bends. This tendency toward outer bank selection was most obvious within the meandering area between RM 243-143, where 35 (81.8%) of the 44 colonies and 12,695 (92.4%) of the 13,737 breeding pairs nested on outer bends.

Bank Swallow colonies often have open terrain immediately above and behind them. The habitat above colonies has ranged from sand bars to riparian forest, and grassy fields to oak woodlands, but usually retains a patchy openness compared with surrounding areas. In orchards these are often areas of small or removed trees. Oak woodland and riparian forests are often interspersed with patches of grassy fields.

Bank Swallow nest sites consist of burrows dug into the bank to a depth of 18-36 inches. Burrows are about 2 inches tall and 3 inches wide and most often found in soils that are fine sandy loam to loam in texture. After a short courtship, both sexes actively dig the nest burrow into the side of banks that generally deviate less than 7 degrees from vertical (90 degrees). Burrows that remain from a previous season may be used by a pair if available or after a bit of renovation. Burrows are located in colonies that may be relatively small (10 burrows) to quite large (3000 burrows). During a 1986 study on the Sacramento River, over one-half (55.9%) of the available burrows were occupied by a breeding pair of birds (Humphrey and Garrison 1987). The aspect of each burrow determines the microclimatic features within the 1 1/2 to 3 foot deep burrow that are necessary for successful hatching and brooding of young. Climatic features of the breeding site are important for the survival and comfort of adult birds and terrestrial and aquatic flying insects, which are the main prey of the Bank Swallow. All of the optimum features of habitat described above exist in certain portions of California, but in relatively short supply. At the present time, Sacramento River stream banks are the most important and most threatened of all habitats Bank Swallows occupy in California.

MANAGEMENT AND RECOVERY RECOMMENDATIONS

The Central Valley population, comprised of the Sacramento River and the Feather River populations, because it represents 64% of the state's population of Bank Swallows clearly must be the focus for management of the species in California. Since the continued destruction of bank habitat through rip-rap projects is the most serious threat to the species, and one of the forces that has brought about the need for this petition, it is critical that alternatives to this activity be found. If alternatives to rip-rapping and effective mitigation techniques to replace lost habitat are not found, then the long-term outlook for survival of the Bank Swallow on the Sacramento River, and perhaps the remainder of the state, is poor.

Some formal discussions have taken place involving the Corps, U.S. Fish and Wildlife Service, Department of Water Resources and DFG regarding Bank Swallow

habitat management and mitigation planning. Some progress is being made to avoid direct mortality at colonies during nesting by delaying construction until after the nesting season. There has been some encouraging preliminary success with mitigation experiments including construction of artificial nesting banks and habitat improvements on the Sacramento River. Funds to monitor and evaluate these experimental mitigation techniques have been made available to the U.S. Fish and Wildlife Service by the Corps.

Because the Bank Swallow is not a listed species, it has not been adequately considered in assessing project impacts or implementing mitigation for these impacts. Since these projects have the potential to severely reduce Bank Swallow habitat and the populations that are dependent on that eroding bank habitat, the need to develop effective mitigation is vitally important. Without some sort of concerted effort and a definite plan to preserve habitat and mitigate for losses of Bank Swallow colonies, the Butte Basin Project, the Chico Landing to Red Bluff Project, and the Sacramento River Bank Protection Project have the potential to significantly reduce populations of Bank Swallows below levels necessary to maintain a biologically viable population.

Bank Swallows, as migratory birds, are afforded protection under the Migratory Bird Treaty Act which protects nests and young from rip-rap projects during the nesting season. The timing of operations to avoid the Bank Swallow nesting season (April 1 - August 1) will prevent episodes of mortality such as have been documented in the past. At present there are no specific management plans, either private, state, federal, or local geared specifically to protect Bank Swallows and their unique habitat. It will be necessary to develop coordinated plans for management and to preserve, through conservation easement, purchase of land in fee title, dedication or other means, those areas that have been identified as significant for breeding Bank Swallow populations.

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