

# Memorandum

To : Mr. Robert R. Treanor  
Executive Director  
Fish and Game Commission

Date : February 18, 1997

From : Department of Fish and Game

Subject : Agenda Item for the Fish and Game Commission's March 6-7, 1997 Meeting Re: Receipt of the Department of Fish and Game's Annual Report on the Status of Recovery of the Threatened Bank Swallow (*Riparia riparia*)

On March 3, 1989, the Commission listed the bank swallow as a threatened bird species in accordance with the California Endangered Species Act (CESA) and pursuant to Section 2070, Fish and Game Code, and Section 670.1, Title 14, California Code of Regulations. This action occurred based on a Department petition that documented the species had declined throughout its range within California, was extirpated from approximately 50 percent of its historic range (primarily in the southern part of the State), and faced further reduction in populations and habitat due to ongoing bank protection projects of the State Reclamation Board (SRB) and the U.S. Army Corps of Engineers on the Sacramento River, Feather River, and major tributaries. Sacramento Valley riparian systems provide habitat for over 70 percent of the remaining population.

Department field research conducted during the bank swallow breeding seasons in 1986 and 1987, followed by annual monitoring, established the scientific basis for the petitioned action that recommended listing of the species. In addition, the Department had previously reported in 1978 on the status of the bank swallow in its *Bird Species of Special Concern* publication and concluded at that time that the total population of breeding bank swallows within the State was extremely low relative to that of other species of swallows. The report identified the primary reason for the decline and continuing threat to breeding colonies as channelization of rivers by the SRB and the Corps. Many colony sites in the Sacramento Valley are threatened by planned bank protection projects currently proposed and approved for construction by the Corps.

A recovery plan for the bank swallow was completed and presented to the Commission for adoption in 1993. It was the first such plan for a species that is State listed and not also federally listed. A recovery team consisting of representatives of the Department, State Reclamation Board, Corps, State Lands Commission, and members of the public was formed prior to the completion of the recovery plan in the same year as the listing became final, 1989. The recovery team met once during 1996. Some of the issues discussed at team meetings since 1989 included the development of the recovery plan, mitigation experiments at bank protection projects, and annual population surveys. In addition, at the most recent meeting, a computer model of the Sacramento River was demonstrated by the Department of Water Resources.

The model predicts flow and erosion patterns based on past fluvial processes that have been documented. The model will be useful in preserve design and determining which banks are likely to provide habitat suitable for bank swallows in the future. Each population survey that has been conducted since the Department's first study in 1986 has included biologists and/or engineers from the various agencies and groups that make up the recovery team. The 1996 population survey was conducted by biologists of the Department's Wildlife Management Division, an Environmental Specialist from the Corps, and a biologist from the U.S. Fish and Wildlife Service's Sacramento Office.

In 1992, the Department completed a population viability analysis (PVA) of the Sacramento River population of bank swallows in an attempt to determine the risks of extinction based solely on the current biological factors affecting these birds. Habitat loss was not factored in as a population depressing variable. One very important factor facing the current population is their low breeding numbers. The findings of the PVA indicated that a population of 10,000 pairs has a substantial risk of falling to 1,000 pairs or disappearing entirely. However, the results of the 1996 survey indicated an estimated population on the Sacramento River of 5,800 pairs. Please refer to Table 1 (attached) for a summary of bank swallow population information and bank swallow population survey results for 1986 through 1996. Breeding pair estimates were derived by multiplying the total burrow count figures (an index of population trend) by an objective estimate of burrow occupancy (45 percent) derived from field studies.

The PVA has been used to estimate the level of population needed to ensure recovery of bank swallows in the State. Even under the most ideal conditions (i.e., no further loss of habitat due to bank protection projects), a population of the current size may require an increase to at least 50,000 pairs to ensure a less than 50 percent chance of falling below 5,000 breeding pairs within the span of the next 50 years. A reasonable recovery target population may be 75,000 pairs of bank swallows.

While most of the State's population of bank swallows exists in the Sacramento Valley and this has become the focus of the Department's recovery effort, there are additional scattered colonies in parts of northern and northeastern California. Some colonies are on public lands, such as the Department-administered bank swallow colony at Fall River Mills in Shasta County. However, others are on private lands where various threats exist that must be closely monitored to ensure against adverse impacts of local stream channelization projects or riparian habitat degradation. While these colonies make up a small fraction of the statewide population, it is important to provide them protection, especially as the core populations in the Sacramento Valley face the threat of decline and possible elimination. There have been only sporadic surveys conducted at colonies outside the Sacramento River corridor since 1987.

Between 1986 and 1996, an average of 8,790 pairs of bank swallows in approximately 57 colonies nested along the Sacramento River. This represents about 24 pairs in 0.14 colonies per mile of river. Using a conservative analysis based on the

1986 to 1996 pair and colony densities, habitat for an additional 1,890 pairs may have been lost between 1960 and 1996 as a direct result of habitat made unavailable due to bank protection projects. Additional miles of riprap are scheduled to be installed through the year 2000. These planned work sites will impact additional miles of potential habitat for the bank swallow and may, thereby make it much more difficult to effect the recovery of this State-listed species.

The bank swallow relies on near vertical slopes of easily crumbled soils in which to construct its nesting burrows. Burrow nesting habitat is often found on eroding river banks. Eroding bank sites are coincidentally the same areas traditionally targeted for bank protection. Therefore, it is difficult to develop effective mitigation for the impacts of projects which are designed to stop natural erosion of earthen banks. Any artificial earth bank structure that was designed to replace lost natural habitat would have to be maintained to fairly rigid specifications annually to make it suitable for nesting bank swallows. The danger of having an entire population of birds solely dependent on artificial structures for their continued existence has presented a serious biological risk.

Artificial sites that have been used in past years by bank swallows have recently been abandoned due to deterioration of habitat quality resulting from inadequate annual maintenance. A danger with reliance on a series of artificial nesting structures as mitigation is that such a scheme presents a biological limitation to proposing delisting for the species. It would be risky to assume that all artificial nest sites would be continually maintained and uniformly suitable year after year without interruption due to a variety of natural and human-caused factors, such as budget cuts in the latter case, which could make funds unavailable for critically important annual maintenance. Therefore, if it was totally dependent on artificial nest sites, the bank swallow may never be recovered from its status as a threatened species.

The effects of the 1996-97 winter floods on bank swallow habitat are as yet unknown. The last time we had flooding of that magnitude was in 1985-86. Our first study of bank swallows began in the spring of 1986 so we had no way to compare results to previous years' habitat condition and population abundance and distribution. We know from experience that high flood flows do create as well as destroy suitable bank swallow habitat. Good habitat is created when flood flows shear banks vertically; unsuitable habitat results when the flows cause the banks to be sloped back away from vertical. Recent high flow years have not created the quantity and quality of habitat that we had predicted, and the long-term population trend on the Sacramento River continued to decline.

If the long-term trend of breeding pair population decline continues in 1997, the population may face an even greater threat of extinction. A five-year review of the status of the bank swallow was reported to the Commission in early 1994. In that report, the Department noted that, should the results of annual population monitoring show continued deterioration along the Sacramento River, which is the core of the remaining population in

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the State, then the Department may consider recommending endangered status for the species in the future. The population status as of the 1996 breeding season is close to that which meets the criteria for endangered species designation as specified under CESA. However, since the population showed a slight improvement over 1995, continued monitoring is necessary to further document the trend.

A copy of the recovery plan is attached for the Commission's reference. If you have any questions regarding the matter, please contact Mr. Terry M. Mansfield, Chief of the Department's Wildlife Management Division, at (916) 653-7203. Department staff will be available at the March meeting to respond to questions or comments from the Commission.

**COPY** Original Signed by:  
Jacqueline E. Schafer  
Jacqueline E. Schafer  
Director

**Attachments**

**TABLE 1**  
**BANK SWALLOW POPULATION INFORMATION**  
 by River Reach on the Sacramento River, California  
 1986-1996

RIVER REACH	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Avg.
<b>RM 81-143</b> <b>Verona to Colusa</b>												
Number of Colonies	13	12	9 <sup>a</sup>	6	6	6	9	8	6	4	5	8 <sup>b</sup>
Total Burrows	2,480 <sup>c</sup>	3,720	1,870	750	980	1,870	1,650	1,610	2,470	540	700	1,690
Avg. Burrows/Colonies	190 <sup>c</sup>	310	210	130	160	310	180	200	410	140	140	210
<b>RM 144-168</b> <b>Colusa to Butte City</b>												
Number of Colonies	15	13	18	14 <sup>a</sup>	15	9	14	15	11	12	12	15
Total Burrows	6,060	6,600	7,790	6,580	7,440	6,110	6,840	5,230	4,870	2,080	2,690	5,660
Avg. Burrows/Colonies	400	510	430	470	500	680	490	350	440	170	120	380
<b>RM 169-199</b> <b>Butte City to Hamilton City</b>												
Number of Colonies	15	16	28	21	15	14	15	11	10	11	11	15
Total Burrows	7,530	5,070	9,570	6,970	4,850	3,960	4,500	1,950	3,400	2,510	2,490	4,800
Avg. Burrows/Colonies	500	320	340	330	320	280	300	180	340	230	230	320
<b>RM 200-243</b> <b>Hamilton City to Red Bluff</b>												
Number of Colonies	23	20	16 <sup>a</sup>	16 <sup>a</sup>	15	13	14	10	10	15	19	16
Total Burrows	11,530	8,540	6,520	6,520	6,880	4,300	4,050	3,820	4,440	4,660	5,650	6,080
Avg. Burrows/Colonies	500	430	400	400	460	330	290	380	440	310	300	380
<b>RM 243-292</b> <b>Red Bluff to Redding</b>												
Number of Colonies	6	5	5 <sup>a</sup>	5 <sup>a</sup>	3	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5	5 <sup>a</sup>	5
Total Burrows	1,660	1,400	1,290	1,290	820	1,290	1,290	1,290	1,290	1,290	1,290	1,290
Avg. Burrows/Colonies	280	280	260	260	270	260	260	260	260	260	260	260
<b>Survey Total - RM 81-292</b> <b>Verona to Redding</b>												
Number of Colonies	72 <sup>d</sup>	66	76	62	54	47	57	49	42	47	52	57 <sup>e</sup>
Total Burrows	29,260	25,330	27,040	22,110	20,970	17,530	18,330	13,900	16,470	11,080	12,820	19,530 <sup>e</sup>
Avg. Burrows/Colonies	410	380	360	360	390	370	320	280	390	240	250	340 <sup>e</sup>
Total Breeding Pairs <sup>f</sup>	13,170	11,400	12,170	9,950	9,440	7,890	8,250	6,260	7,410	4,990	5,770	8,790
% of Baseline Population	100	87	92	76	72	60	63	48	56	38	44	67
% of Population Decline	0	13	8	24	28	40	37	52	44	62	56	33

<sup>a</sup>Averages based on survey information were included as an estimate for years without surveys.

<sup>b</sup>Reach averages based on available survey data for that reach; these data are the most illustrative of population trends within the reach.

<sup>c</sup>Burrow numbers rounded to nearest 10 burrows.

<sup>d</sup>Annual survey totals include reach averages for years without surveys; yearly totals are not as accurate for inferring population trends as reach averages.

<sup>e</sup>Includes annual totals that have estimates based on reach averages.

<sup>f</sup>Total burrows X average burrow occupancy rate (0.45) = total breeding pairs.