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

March 24, 2000

Agenda Item for the Fish and Game Commission's April 6 - 7, 2000, Meeting Re: Receipt of the Department of Fish and Game's Annual Report on the Status of the Threatened Bank Swallow (*Riparia riparia*)

This constitutes the Department's annual report on the status of the bank swallow breeding population in the State. The field data that form the basis of the report were gathered by the Department during 1986 to 1999. After the species was listed in 1989, the Commission requested that the Department thereafter report annually on the trend of the population. Since the Sacramento River subpopulation is the largest and most important in the State from a management standpoint, it will be considered the "population" for purposes of this report.

BACKGROUND:

Listing History and Justification

On March 3, 1989, the Commission took action to include the bank swallow as a threatened bird species according to 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 was taken based on a Department petition that documented that 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 and the U.S. Army Corps of Engineers (Corps) 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 Reclamation Board and the Corps. It was projected that many colony sites in the Sacramento Valley would be threatened by several bank protection projects then proposed and approved for construction by the Corps. This would be particularly serious in those portions of

the Sacramento River where bank swallows maintained the greatest colony density.

Species Biology and Habitat

The bank swallow is the smallest North American swallow species. The bird builds nests within a 2-3 foot deep burrow that it digs perpendicularly into near vertical earthen banks along streams, coastal bluffs, and sand and gravel pits. In California it relies on naturally eroding habitats of major lowland river systems. The species is colonial and migratory, spending the spring and summer months in the Central Valley and wintering in South America. The South American wintering habitat is similar in nature to the breeding habitat, broad open lowland river valleys. The several colonies that make up the breeding population in California each year have ranged in size from 5 to over 3,000 burrows. About half of these are used as nest sites at any particular time. The birds lay a clutch of 3-5 eggs beginning in early April at the Sacramento river colonies. By mid-July most nesting activities are completed. Bank swallows feed on a variety of flying insects. Bank swallows are relatively short-lived species with high infant mortality and an average life span of 2-3 years for adults. Collapsed burrows due to natural bank sloughing or human caused disturbance or colony destruction are significant mortality factors for nestlings.

Historical and Current Distribution

The bank swallow once bred throughout the lowlands of the State with major populations on the broad river valleys of central California. There were south coastal plain populations from Santa Barbara to San Diego. Additional colonies were established wherever local conditions of habitat and other requirements allowed. Included in this group were colonies in parts of the Central and North Coast at the mouths of major rivers and smaller, meandering river valleys of the north and northeastern part of the State. A century ago, colonies thrived at such locations as the Los Angeles River, San Pedro, Oceanside, and Santa Cruz.

The current population is restricted to portions of the upper Sacramento River, primarily between Redding and Colusa, about four or five central and north coast colonies, and scattered colonies in northern and northeastern California including a large one (usually about 1,500 burrows) at Fall River Mills on Department land. There are only handful of unique coastal nesting areas (Ft. Funston and Ano Nuevo) and a few colonies are known from Mono and Inyo Counties.

Reasons for Decline

Since the 1960 Congressional Authorization of the Sacramento River Bank Protection Project, more than 130 lineal miles of rock revetment (rip-rap) has been placed on the banks of the Sacramento River in locations coinciding with the largest remaining population segment of the bank swallow in the State. This activity, which largely occurred during the height of the

season prior to 1985, resulted in the direct loss of countless young birds and the destruction of a significant portion of all habitat available to the birds for establishing colonies.

Since 1986, the population of bank swallows on the Sacramento River has declined gradually from about 13,000 pairs to the current 8,200 pairs and the number and average size of colonies has decreased (Table 1). From 1995-98, the population apparently stabilized at approximately 5,000 pairs and then increased significantly to 8,210 in 1999, but the average for the period from 1995-99 was 5,830 pairs. Only future monitoring will determine the direction of the population trend. Bank swallows are dynamic species and the sudden increase in 1999 may be attributed to increased habitat availability and suitability which allowed certain colonies to double in sized compared to previous years.

RESEARCH:

Baseline Studies

A baseline study was completed in 1986 on the Sacramento River. The following year, further study of the Sacramento River was completed along with an additional investigation of subpopulation segments in the remainder of the historical range of the species. These two investigations established the first Sacramento River and Statewide population estimates for the species. Additional information was gathered on habitat relationships, life history, pesticides, and threats to habitat. It is now time to repeat these studies in order to gather reproductive and other data important to recovery planning.

Annual Monitoring

Following the two years of intensive study in 1986-87, a program of annual monitoring was begun in 1988 and continues to the present time. Surveys of all known bank swallow habitat on the Sacramento river are conducted by Department and cooperator personnel from the Corps, Department of Water Resources, and the U.S. Fish and Wildlife Service each June. The surveys cover just over 200 miles of the river and are conducted on three days by motor boat. Results of the two intensive studies and these monitoring surveys have established the observed population trend for the past 13 consecutive years. This monitoring effort is the currently the sole activity being used to track the status of the species.

OUTLOOK FOR RECOVERY OF THE SPECIES:

Recovery Plan

After the species was listed in 1989 a recovery team consisting of representatives of the Department, State Reclamation Board, Corps, State Lands Commission, and members of the public was formed. Some of the issues discussed at team meetings since 1989 included the

of a recovery plan, mitigation experiments at bank protection projects, and annual population surveys. A recovery plan (please see attachment) for the bank swallow was ultimately requested by the Commission and presented to them for adoption in 1993. It was the first such plan for a State listed species.

The recovery plan aims to conserve and maintain a self-sustaining wild population free from the threat of habitat loss and unnatural disturbance. A major component of the existing recovery plan is a population model that assesses the risks of extinction and plots a target for a level of abundance and reproductive performance necessary to attain recovery based on survey information from 1986-92. However, the recovery plan should be revised to reflect the current status of modeling technology and recent population information and to consider what options remain to prevent extirpation of the species from the State. The breeding population had declined significantly between 1992-98 but has also rebounded appreciably in 1999 (Table 1). Prior to revising the recovery plan, there need to be certain research projects completed that will form the basis for any new recommendations.

Population Viability and Risk of Extinction

In 1992, the Department contracted with a mathematical modeling expert to develop a population viability analysis (PVA) of the Sacramento River population of bank swallows in an attempt to determine the risks of extinction and reduction based solely on the population dynamics of these birds. Habitat loss was not factored in as a population depressing variable so that the PVA must be considered a relatively optimistic view of the bank swallow status.

While PVA's alone should not be relied upon for risk assessment, they are very useful conservation tools to be used in concert with other research findings, particularly population monitoring data gathered over a long period of time. They are particularly valuable in identifying data gaps and identifying a trend of risk given adequate input data. The findings of the PVA for bank swallows have indicated that one very important factor facing this population is simply their small breeding numbers. Small, fluctuating populations tend to go extinct more readily. Also, the contribution of population migration numbers, both the additions and the subtractions, was identified as a data gap needing further study. According to the PVA's risk assessment in 1992, a population of 10,000 pairs had a substantial risk of falling to 1,000 pairs or disappearing entirely. This finding coupled with our monitoring trend data point to increased risk over time.

The results of the 1995-98 surveys indicated an estimated annual population on the Sacramento River of only about 5,000 breeding pairs, which placed the population at increased risk (Table 1). In 1999 the population increased to about 8,200 which has lessened the risk of extinction somewhat (Table 1). As a point of clarification, breeding pair estimates have been derived by multiplying the total burrow count figures (an index of population trend) by an objective estimate of burrow occupancy (45 percent) obtained from early field studies.

The PVA has been used to estimate the level of population needed to ensure a margin for safety from extinction and to allow for recovery of bank swallows in the State. The population estimated in this manner could, therefore, be considered the minimum target population for recovery of the bank swallow. Only after the recovery level population has been achieved could the species be considered for removal from the list of threatened bird species. According to the PVA, even under the most ideal conditions (i.e., no further loss of habitat due to bank protection projects), a population of 10,000 pair 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. The bank swallow population has been slightly above or below 5,000 pairs during four of the past five breeding seasons (Table 1).

A reasonable recovery target population may be developed from the bank swallow PVA. However, since that analysis is now eight years old, more up to date research is needed before a specific target can be set. Our past five year estimate of 5,000 to 8,000 pairs is already at the lower limit postulated in the PVA to represent a situation where there is a serious risk of extirpation of the bank swallows on the Sacramento River.

Threat to Remaining Habitat

Our studies and investigations and reports of other agencies have documented the loss of bank swallow habitat due to bank protection projects of the Reclamation Board and the Corps. Scores of miles of the Sacramento River have been riprapped under the Sacramento Bank Protection Project. Many of those project sites eliminated formally active colonies and potential habitat for the bank swallow. The Project is currently in its third phase of planning and constructing of riprap at several work sites on the Sacramento River. Since 1986, approximately 211 miles of the Sacramento River have been surveyed and active or potential bank swallow habitats have been documented by the Department along this entire length annually. About 130 lineal miles of bank is currently under rock revetment installed by the Corps and is currently unusable by bank swallows for nest sites. Additional miles of riprap and consequent bank swallow habitat loss 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 Reclamation Board has requested that the Department consider a programmatic approach to the incidental taking associated with their planned bank protection projects. Each proposed new bank protection work site must be evaluated for its impacts on occupied and potential bank swallow habitat. Any loss of habitat must be fully mitigated. Mitigation will take the form of suitable habitat acquired and set aside as preserve lands. Cumulative impacts may be addressed in the programmatic incidental take permit so that all of the many work sites along the Sacramento river may be evaluated for their total affect on the population of bank swallows. Department Regional and Headquarters personnel will be working with the Reclamation Board to develop the details of a suitable incidental take permit and associated mitigation/conservation

plan that meet the provisions of the California Endangered Species Act (CESA).

Existing Management/Recovery Actions

Currently, some positive actions have taken place that have the potential to help ensure the continued existence of a bank swallow population in the State. These include the programs for habitat management contained under the SB 1086 legislation which established the Sacramento River Advisory Council. Among the most promising proposals by the Committee are those advocating a return to a naturally meandering river system, which is a key feature cited as necessary for species recovery in the Bank Swallow Recovery Plan. Lands have been purchased and added to the State Wildlife Area and Federal Refuge system on the Sacramento River. Many of these lands have several active colonies documented during Department monitoring surveys each year.

There may be significant further opportunities for habitat restoration, enhancement, and management through implementation of the CALFED Ecosystem Restoration Program and the Anadromous Fisheries Restoration Program (AFRP) under CVPIA. With the considerable resources available through these efforts, real progress may be made toward the recovery of the bank swallow if, for example, some research, monitoring, and habitat acquisitions receive a high priority for this species. The Multi-species Conservation Strategy (MSCS) for the CALFED Program contains conservation measures which include bank swallow surveys in suitable habitat areas in locations potentially affected by CALFED project activities.

The MSCS also contains the requirement to avoid disturbance of active colonies during April to August each year and to avoid or minimize actions that could adversely affect colonies or potential habitat. In addition to the above mitigation measures, the MSCS species goal for the bank swallow is to contribute to the recovery of the species by implementing measures such as protecting all known colonies and allowing portions of the Sacramento River without rip rap to continue to meander freely to provide the eroding bank habitats required by this species. Although no specific direct actions are planned to restore the species and its habitat, the general objectives for natural floodplain processes will be beneficial to the bank swallow. Finally, there is also a need to ensure that any CALFED and other entity sponsored restoration projects aimed at the recovery of other species do not conflict with the habitat needs of the bank swallow.

ANALYSIS OF THE PROBLEM:

Difficulties in Developing Effective Mitigation

The bank swallow relies on near vertical slopes of friable soils which are often found on eroding river banks in which to construct its nesting burrows. These eroding bank sites are

coincidentally the same areas traditionally targeted for bank protection work sites. 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. Having an entire population of birds solely dependent on artificial structures for their continued existence presents a serious biological risk. Artificial nest colony sites that were used in past years never fully mitigated the loss of the natural colony they replaced and have subsequently been abandoned due to deterioration of habitat quality resulting from inadequate annual maintenance. Even at those artificial colonies where nesting did take place, it was only at a fraction of the level that occurred during pre-project times at the natural colony that was lost at that location.

An additional objection to 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. In this example, 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 man-made 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 could never be recovered and returned to an un-threatened status.

RECOMMENDED STATUS FOR THE BANK SWALLOW:

Despite a large population increase in 1999, the species still appears to be at risk. If the overall 15 year trend of decline continues in 2000, the population may face an even greater threat of extinction. In a 1994 five-year status report on the bank swallow, it was stated that should the results of annual population monitoring show continued deterioration on the Sacramento River, which represents the core of the remaining population in the State, then the Department should recommend endangered status for the species. The population status as of the 1999 breeding season, although increased, still is close to endangerment. Relative to the abundance of other swallows, the bank swallow is but a tiny fraction of all other species in the State. Although endangered status is not proposed at this time, the Department intends to closely monitor the population annually to determine the trend, particularly in light of the recent increase in breeding pairs.

Besides the lower populations in recent years, an additional troubling matter is the continuing and projected losses of habitat at active and potential colony sites in order to effect flood and erosion control. Erosion control projects that appear to be privately financed are appearing with greater frequency during our annual surveys on the Sacramento River. If this trend of impacts continues it may be necessary to reclassify the bank swallow as endangered simply due to persistent destruction of habitat by State and Federal bank protection agencies and, most recently, private interests.

FUTURE STATUS REPORTS TO THE COMMISSION:

The Department hereby recommends that, commencing in 2001, the reporting of the status of the bank swallow to the Commission take every two years rather than an annual basis. Events or activities of a significant nature, such as a proposal to reclassify the species, could thereby be scheduled as Commission agenda items on an as needed basis.

If you have any questions regarding this report on the status of the bank swallow, please contact Ms. Susan Cochrane Levtisky, Chief of the Department's Habitat Conservation Planning Branch by telephone at (916) 653-4875. Department staff will be available at the April meeting to respond to questions or comments from the Commission.

ROBERT C. HIGHT
Director

Attachment

cc: Department of Fish and Game
Sacramento, California
Ms. Susan Cochrane Levitsky
Mr. Ronald D. Rempel
Mr. LB Boydstun
Mr. Ron Schlorff

SCHLORFF:ac

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Table 1. Bank Swallow breeding population information, Sacramento River, 1986-99.

RIVER REACH	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
RM 81-143 Verona to Colusa Number of Colonies	13	12	9[a]	6	6	6	9	8	6	4	5	7	0	5
Total Burrows	2,480[c]	3,720	1,870	750	980	1,870	1,650	1,610	2,470	540	700	730	0	370
Avg. Burrows/Colonies	190[c]	310	210	130	160	310	180	200	410	140	140	100	0	70
RM 144-168 Colusa to Butte City Number of Colonies	15	13	18	14[a]	15	9	14	15	11	12	12	14	7	12
Total Burrows	6,060	6,600	7,790	6,580	7,440	6,110	6,840	5,230	4,870	2,080	2,690	2,150	1,810	2,520
Avg. Burrows/Colonies	400	510	430	470	500	680	490	350	440	170	120	150	260	210
RM 169-199 Butte City to Hamilton City Number of Colonies	15	16	28	21	15	14	15	11	10	11	11	14	12	13
Total Burrows	7,530	5,070	9,570	6,970	4,850	3,960	4,500	1,950	3,400	2,510	2,490	2,600	3,050	6,470
Avg. Burrows/Colonies	500	320	340	330	320	280	300	180	340	230	230	190	250	500
RM 200-243 Hamilton City to Red Bluff Number of Colonies	23	20	16[a]	16[a]	15	13	14	10	10	15	19	12	18	22
Total Burrows	11,530	8,540	6,520	6,520	6,880	4,300	4,050	3,820	4,440	4,660	5,650	4,770	4,940	7,600
Avg. Burrows/Colonies	500	430	400	400	460	330	290	380	440	310	300	400	270	340
RM 243-292 Red Bluff to Redding Number of Colonies	6	5	5[a]	5[a]	3	5[a]	5[a]	5[a]	5[a]	5	5[a]	5[a]	5	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	1,290	1,290
Avg. Burrows/Colonies	280	280	260	260	270	260	260	260	260	260	260	260	260	260
Survey Total - RM 81-292 Verona to Redding Number of Colonies	72[d]	66	76	62	54	47	57	49	42	47	52	52	42	57
Total Burrows	29,260	25,330	27,040	22,110	20,970	17,530	18,330	13,900	16,470	11,080	12,820	11,540	11,090	18,250
Avg. Burrows/Colonies	410	380	360	360	390	370	320	280	390	240	250	220	260	320
Total Breeding Pairs[f]	13,170	11,400	12,170	9,950	9,440	7,890	8,250	6,260	7,410	4,990	5,770	5,190	4,990	8,210
% of Baseline Population	100	87	92	76	72	60	63	48	56	38	44	39	38	62
% of Population Decline	0.00	13	8	24	28	40	37	5	44	62	56	61	62	38

a Averages based on survey information were included as an estimate for years without surveys.
b Reach averages based on available survey data for that Reach; these data are the most illustrative of population trends within the Reach.
c Burrow numbers rounded to nearest 10 burrows.
d Annual survey totals include Reach averages for years without surveys; yearly totals are not as accurate for inferring population trends as Reach averages.
e Includes annual totals that have estimates based on Reach average.
f Total burrows X average burrow occupancy rate (0.45) = total breeding pairs