

**ROBERT C. HIGHT**, Director

Agenda Item for the Fish and Game Commission's April 4-5, 2002 Meeting  
Receipt of the Department of Fish and Game's Periodic Report on the Status of the  
Threatened Bank swallow (*Riparia riparia*)

This constitutes the Department of Fish and Game's (Department) semi-annual report on the status of the Bank swallow breeding population in the State. The last such report was submitted in 2000. The data that form the basis for this report was gathered by the Department and cooperators during studies and monitoring from 1986 through 2001. After the species was listed in 1989, the Fish and Game Commission (Commission) requested that the Department thereafter report annually on the status of the Bank swallow population. In 2000 the Commission agreed that the Department report on the status of the Bank swallow every two years rather than annually.

Since the Sacramento River subpopulation is the largest and most important in the State from a management standpoint, it is considered the "population" for purposes of this status report. Additional Bank swallow colonies are found primarily in the northern part of the State. Periodic reports are developed by Department and cooperator personnel on the status of these colonies.

**SUMMARY:**

The following summarizes the current status of the Bank swallow population and the critical issues surrounding the prospects for recovery of the species:

- 1) The Bank swallow was listed by the Commission as a threatened species in 1989 based upon a petition originated by the Department.
- 2) The major Bank swallow population on the Sacramento River has been monitored annually since 1986; other smaller populations have been periodically surveyed elsewhere in the State.
- 3) After a gradual decline from 1986 (from 13,000 pairs down to about 5,000 pairs), the Bank swallow population began to increase in 1999; that increase continues but the current population (2001) of about 9,700 pairs is still less than the baseline level.

- 4.) Loss of habitat to agency and privately sponsored bank protection projects has continued since 1960; there are future plans for more projects that could impact occupied and potential Bank swallow habitat.
- 5) Loss of Bank swallow young at colony sites due to bank protection projects was curtailed in 1985, and no losses at State and Federal sponsored projects have been documented since that time; however, losses at privately sponsored projects may still occur.
- 6) Research is needed before the decade old Bank swallow recovery plan can be revised to reflect new goals, objectives, and actions.
- 7) CALFED Multi-species Conservation Strategy, Riparian Habitat Joint Venture and SB 1086 plans do include information and conservation resources regarding the species, and riparian habitats in general.
- 8) Results and risk assessments of a decade old PVA indicate that the Bank swallow population remains vulnerable to further loss and should therefore be retained on the list of State threatened species.

## **BACKGROUND:**

### **Listing History and Justification**

On March 3, 1989, the Commission included the Bank swallow as a threatened bird species in accordance with the California Endangered Species Act (CESA), and Section 670.1, Title 14, California Code of Regulations. Commission action was based on a Department originated petition recommending listing under CESA. The Department's petition contained findings that documented that the species had declined throughout its range within California, was extirpated from approximately 50 percent of its historical range (primarily in the southern part of the State), and faced further reductions 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* (BSSC) 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 BSSC report identified the primary reason for the decline and continuing threat to breeding colonies as channelization, and associated construction disturbances, 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 birds build nests within 2-3 foot deep burrows that are dug perpendicularly into near vertical earthen banks along streams, coastal bluffs, and sand and gravel pits. In California, Bank swallows rely 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 North Central South America. The South American wintering habitat is similar to the breeding habitat, being broad, open lowland river valleys.

The colonies that make up the breeding population in California each year have ranged in size from 5 to over 3,000 burrows; the average colony consists of about 350 burrows. Research indicates that about half of all burrows dug are used as nest sites at any particular time. The birds lay a clutch of 4-5 eggs beginning in early to late April at the Sacramento River colonies. After a two-week incubation, and a further three weeks of chick development, fledgling Bank swallows are ready to leave the nest. 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 a high juvenile mortality rate (about 70-80%) and an average life span of 2-3 years for adults. Collapsed burrows due to natural bank sloughing or human caused disturbance and 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. A south coastal plain population existed 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 Coast and North Coast at the mouths of major rivers and along smaller meandering river valleys of the north and northeastern parts of the State. A century ago, Bank swallow colonies thrived at locations that included the Los Angeles River, San Pedro, Oceanside, and Santa Cruz.

The current population of Bank swallows is restricted to portions of the upper Sacramento River, primarily between the cities of Redding and Colusa, about four or five Central Coast and North Coast colonies, and scattered colonies in northern and northeastern California including a large one (usually about 1,500 burrows) at the town of Fall River Mills on Department owned property. There remain only three coastal nesting areas (Smith River mouth, Ft. Funston in San Francisco, and Ano Nuevo State Park), and a few colonies are known from Mono and Inyo Counties.

### **Reasons for Initial Decline and Recent Increase**

Since the U.S. Congress authorized the Sacramento River Bank Protection Project in 1960, more than 130 lineal miles of rock revetment (rip-rap) has been placed on the banks of the Sacramento River. Many construction locations have coincided with the largest remaining population segment of the Bank swallow in the State. This bank protection activity, which largely occurred during the height of the breeding season prior to 1985, resulted in the deaths of many young birds and the loss of a significant portion of all habitat available to Bank swallows for establishing colonies. Beginning in 1986, the population of Bank swallows on the Sacramento River declined gradually from about 13,000 pairs to about 5,000 pairs in 1998 (Table 1). From 1999 to 2001, the population has increased annually to the current level of about 9,700 pairs (Table 1). Future annual monitoring will determine the continued direction of the population trend. Bank swallows are a dynamic species and the sudden increase, first observed in 1999, has continued to the present time. Changes in weather patterns and other factors such as habitat availability and suitability may also have contributed to the increase in population.

### **RESEARCH:**

#### **Baseline Studies**

A baseline study of the Bank swallow population was completed in 1986 on the Sacramento River. The following year, further study of Sacramento River Bank swallows was completed along with an additional investigation of subpopulation segments in the remainder of the California historical range of the species. These two investigations established the first Sacramento River and statewide population estimates for the species. The Sacramento River population was estimated to be about 29,000 burrows or 13,000 pairs, based on a burrow occupancy of about 45% (Table 1), and the statewide population was estimated to be about 45,000 burrows with a varying degree of burrow occupancy. Additional information was gathered on habitat relationships, life history, pesticides, and threats to habitat. A repeat of these studies is needed in order to gather current reproductive data and other information 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. Each June, 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. The surveys cover just over 200 miles of the river, and are conducted on three days with the use of a motor boat. Results of the two intensive studies in 1986-87 and subsequent annual monitoring have established the observed population trend for the past 16 consecutive years (Table 1).

## **OUTLOOK FOR RECOVERY OF THE SPECIES:**

### **Recovery Plan**

After the species was listed as threatened 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 development of a recovery plan, mitigation experiments at bank protection projects, and annual population surveys. A recovery plan (see attachment) for the Bank swallow was approved by the Commission in 1992. It was the first such plan for a State-listed species.

The goal of the recovery plan is to conserve and maintain a self-sustaining wild population free from the threat of habitat loss and unnatural disturbance. A major component of the 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. The recovery plan should be revised to reflect the current status of modeling technology and recent population information. It also needs to consider what options remain to prevent extirpation of the species from California. Prior to revising the recovery plan, certain research is needed to form the basis for any new recommendations. Research needed would include, Statewide and Sacramento River repeat studies, migration studies, and a revised population model utilizing the 16 years of monitoring data available.

### **Population Viability and Risk of Extinction**

In 1992, the Department developed a population viability analysis (PVA) of the Sacramento River population of Bank swallows to assess 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. Therefore, the PVA must be considered a relatively optimistic view of the Bank swallow status a decade ago.

While PVA's alone should not be relied upon for risk assessment, they are useful conservation tools to be used in concert with other research findings, particularly population monitoring data gathered over a long period of time. The PVA is particularly valuable in identifying data gaps and identifying a trend of risk given adequate input data. The findings of the PVA for Bank swallows indicated that one very important factor facing this species was their relatively small breeding population. 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 greater than 50% 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 during that era (Table 1). In 1999-2001, the population increased to about 9,700 pairs which has now lessened the risk of extirpation 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 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 extirpation, 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 population level has been achieved could the species be considered for removal from the list of threatened bird species (i.e. delisted). According to the existing PVA, even under the most ideal conditions (i.e., no further loss of habitat due to bank protection projects), a population of 10,000 pairs (our current estimate is 9,700 pairs, Table 1) 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 target population for recovery may be developed from the Bank swallow PVA. However, since that analysis is now a decade old, more up-to-date research is needed before a new specific recovery target can be set. Our past seven year estimate of 5,000 to 9,700 pairs is already at the lower limit postulated in the PVA to represent a serious risk of extirpation of the Bank swallows on the Sacramento River.

### **Threats to Remaining Habitat**

Our studies and investigations, and the reports of other agencies, have documented the loss of Bank swallow habitat due to bank protection projects of the Reclamation Board and the Corps. More than 100 miles of the Sacramento River has

been rip-rapped under the current Sacramento Bank Protection Project. Many of those project sites eliminated formerly active colonies and potential habitat for the Bank swallow. The Project is currently in its third phase of planning and constructing of rip-rap at several work sites on the Sacramento River. Since 1986, approximately 211 miles of the Sacramento River have been surveyed annually and active colonies or potential Bank swallow habitats have been documented by the Department and our cooperators. An estimated 130 lineal miles of bank, involving both sides of the Sacramento River, is currently under rock revetment installed by the Corps, and therefore, permanently unusable by Bank swallows for nest sites. An unknown number of additional miles of rip-rap, and the consequent Bank swallow habitat losses, are scheduled to be installed in the future. These planned work sites will potentially preclude additional miles of potential habitat for the Bank swallow, and may make it much more difficult to recover 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 includes acquisition and protection of suitable habitat. Cumulative impacts may be addressed in a 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 need to work with the Reclamation Board to develop the details of a suitable incidental take permit and associated conservation plan that meet the full mitigation provisions of CESA.

### **Existing Management and Recovery Actions**

Current actions that have the potential to help ensure the continued existence of a Bank swallow population in the State 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 Council are those advocating a return to a naturally meandering river system, which is a key feature cited as necessary for species recovery in the attached Bank swallow Recovery Plan. Lands have been purchased and added to the Department Wildlife Area and Federal National Wildlife Refuge (NWR) systems on the Sacramento River. Many of these lands have several active colonies documented during Department monitoring surveys each year. In particular, the Sacramento River NWR represents the single most important sanctuary system for the Bank swallow in the State.

There may be additional 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, significant progress may be made toward the recovery of this species if, for example, some research, monitoring, and habitat acquisition funding receives a high priority for the Bank swallow. The Multi-species Conservation Strategy (MSCS) for the CALFED Program contains conservation measures which include Bank swallow surveys in suitable habitats at locations potentially affected by CALFED project activities.

The MSCS also contains the requirement to avoid disturbance of active colonies from 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 by 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 flood-plain processes, if implemented, should be beneficial to the Bank swallow. CALFED and other restoration projects are being implemented to help with the recovery of other plant and animal species. The Department will continue to explore ways to include Bank swallow conservation in these activities.

## **ISSUE ANALYSIS:**

### **Developing Effective Mitigation**

In order to construct its nesting burrows, the Bank swallow relies on near vertical slopes of friable soils which are often found on eroding river banks. These eroding bank sites are coincidentally the same areas traditionally targeted by public works agencies for bank protection construction sites. Therefore, it is practically impossible to develop effective mitigation on site for the impacts of projects which are designed to curtail the 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. Additionally, having an entire population of a threatened bird species solely dependent on artificial structures for their continued existence presents a serious biological risk. The two artificial nest colony sites that were used in past years were not successful and have subsequently been abandoned due to deterioration of habitat quality resulting from inadequate annual maintenance. Even at the artificial colony where nesting did take place, it was only at a fraction of the level that occurred during pre-project times at the natural colony formerly at that location.



### **RECOMMENDED STATUS FOR THE BANK SWALLOW:**

Despite a large population increase in 1999-2001, the species still appears to be at risk. 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 Bank swallow population on the Sacramento River, despite increases through the 2001 breeding season, still meets the CESA definition of threatened. Endangered species status is not proposed at this time. Population monitoring should be continued annually to determine the trend over time.

Besides the relatively low population level of Bank swallows, there are continuing losses of habitat at active and potential colony sites. Erosion control projects have been recorded with greater frequency during the past five years of annual monitoring surveys on the Sacramento River. If this trend of impacts continues, it may be necessary to reclassify the Bank swallow as an endangered species due to persistent destruction of habitat. Such habitat losses also could ultimately limit the size of the Bank swallow population and therefore its ability to be recovered.

### **FUTURE STATUS REPORTS TO THE COMMISSION:**

We will submit the next report to the Commission on the status of the Bank swallow in 2004. However, in the event of a significant change on the Bank swallow status, or the need for Commission action, we will schedule an earlier report.

If you have any questions regarding this report on the status of the Bank swallow, please contact Mr. Ronald D. Rempel, Deputy Director, Habitat Conservation Division by telephone at (916) 653-1070 or Ms. Sandra C. Morey, Chief of the Department's Habitat Conservation Planning Branch by telephone at (916) 653-4875.

Attachment

cc: See page 10

cc: Department of Fish and Game  
Sacramento, California

Ms. Diana Jacobs  
Mr. LB Boydston  
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Ms. Sandra C. Morey  
Mr. Dale T. Steele  
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Table 1. Bank swallow breeding population information, Sacramento River, 1986-2001.

RIVER REACH	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>RM 81-143 Verona to Colusa</b>																
Number of Colonies	13	12	9 <sup>a</sup>	6	6	6	9	8	6	4	5	7	0	5	8 <sup>b</sup>	8 <sup>a</sup>
Total Burrows	2,480 <sup>c</sup>	3,720	1,870	750	980	1,870	1,650	1,610	2,470	540	700	730	0	370	1,060	1,060
Avg. Burrows/Colonies	190 <sup>c</sup>	310	210	130	160	310	180	200	410	140	140	100	0	70	130	130
<b>RM 144-168 Colusa to Butte City</b>																
Number of Colonies	15	13	18	14 <sup>a</sup>	15	9	14	15	11	12	12	14	7	12	8	9
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	2,800	4,660
Avg. Burrows/Colonies	400	510	430	470	500	680	490	350	440	170	120	150	260	210	350	520
<b>RM 169-199 Butte City to Hamilton City</b>																
Number of Colonies	15	16	28	21	15	14	15	11	10	11	11	14	12	13	11	14
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	6,930	7,070
Avg. Burrows/Colonies	500	320	340	330	320	280	300	180	340	230	230	190	250	500	630	500
<b>RM 200-243 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	12	18	22	14	15
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	8,390	6,540
Avg. Burrows/Colonies	500	430	400	400	460	330	290	380	440	310	300	400	270	340	600	440
<b>RM 243-292 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 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>
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	1,290	1,290
Avg. Burrows/Colonies	280	280	260	260	270	260	260	260	260	260	260	260	260	260	260	260
<b>Survey Total - RM 81-292 Verona to Redding</b>																
Number of Colonies	72	66	76 <sup>d</sup>	62 <sup>d</sup>	54	47	57	49	42	47	52	52	42	57	46	51
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	20,470	21,520
Avg. Burrows/Colonies	410	380	360	360	390	370	320	280	390	240	250	220	260	320	450	420
Total Breeding Pairs <sup>e</sup>	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	9,210	9,680
% of Baseline Population	100	87	92	76	72	60	63	48	56	38	44	39	38	62	70	74
% of Population Decline	0.00	13	8	24	28	40	37	5	44	62	56	61	62	38	30	26

a Survey data were included as an estimate for years without surveys at that reach.

b Cooperator contributed data.

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 Total burrows X average burrow occupancy rate (0.45) = total breeding pairs.