

Bank Swallow (*Riparia riparia*)

Legal Status

Federal: None.

State: Threatened.



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Global and State Conservation Status: G5S2S3: Global Rank, G5 = Secure: Common; widespread and abundant; State Rank, S2S3 = somewhere between an S2 indicating imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state. and an S3 which indicates vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

Recovery Plan: Recovery Plan: Bank Swallow (*Riparia riparia*) (CDFG 1992).

Species Description and Life History

The bank swallow (*Riparia riparia*) breeds throughout much of the Northern Hemisphere and migrates to spend the winter months in South America, Africa, and southern Asia. It is the smallest of the North American swallows (approximately 13-cm [5.12-in] long). Bank swallows are distinguished from other swallows by their distinctive, complete brown breast band, contrasted against white underparts and its dark brown upper parts. Sexes are similar and cannot be distinguished based solely on plumage characteristics (CDFG 1992).

Seasonal Patterns

Bank swallows arrive in California from their wintering grounds in the southern Amazon basin from mid-March to May and re-establish breeding colonies shortly after arrival. During spring migration, the first individuals arrive in California in mid-March, with numbers peaking in May; during fall migration, the first individuals leave in late July, with a few birds remaining until mid-September (Humphrey and Garrison 1987, Garrison 1999, Garrison 2002). After breeding, bank swallows join mixed-species flocks of swallows that congregate at wetlands and other areas with high concentrations of aerial insect prey, until they depart California for their southward migration in August and September.

Reproduction

Bank swallows nest in colonies in vertical cliffs, most often in lowland riverbanks, coastal bluffs, open pit mines, and roadcuts (CDFG 1992). Following a short courtship, both sexes spend four to five days digging a nest burrow in soft sand/loam strata. Females typically lay four or five eggs, and feed their young at the nest until the young fledge in 18 to 20 days later. Bank swallows are primarily monogamous, and each pair tends one nest. However, extra-pair copulations are frequent which enhances the genetic diversity of a brood and colony (Garrison 1999).

Home Range/Territory Size

Bank swallows actively defend nest burrows and the immediate vicinity of individual burrows. They defend the area around an occupied burrow early in the nesting period. Females select burrows and frequently reject burrows excavated by males until a burrow is suitable for nesting. Thus, typically the number of burrows outnumbers the pairs of bank swallows in a given colony (Garrison 1999).

Foraging Behavior and Diet

Bank swallows often join mixed-species flocks of swallows while foraging over water, meadows, bogs, and other sites where concentrations of aerial insects can be found. At nesting colonies, they forage mostly within 200 meters (656 feet) of their nesting burrows, but this range can vary depending on the distance to good foraging areas. Analysis of contents of 394 stomachs from throughout Canada and the United States disclosed 33.5% ants, bees, and wasps; 26.6% flies; 17.9% beetles; 10.5% mayflies; 8% bugs; and a few dragonflies, butterflies, and moths (Garrison 1999, 2002).

Habitat Requirements and Ecology*Nesting*

Important breeding habitat characteristics include soil moisture, texture, orientation of bank face, bank height, verticality (slope) of the face, and proximity of the colony to foraging areas (CDFG 1992). Bank swallow colonies are often found in fine silt and sandy loam soils (CDFG 1992) represented as three main types: sea cliffs, or hard consolidated sand; river banks of sand and sandy earth; and actively worked sand and gravel pits (Hickling 1959, as cited in CDFG 1992). In California, bank swallows most often nest in steep earthen riverbanks subject to frequent winter erosion events. Nest sites consist of burrows dug into a vertical earthen bank 45- to 90-cm (17.72- to 35.43-in) deep, 5-cm (1.97-in) high, and 7.6-cm (2.99-in) wide (Garrison 1999).

Unique combinations of optimal habitat characteristics may dictate the size and success of individual bank swallow colonies. Burrows that remain available from a previous season may be used in subsequent years. Bank swallow nesting colonies range in size from relatively small (10 burrows) to very large (3,000 burrows) (CDFG 1992). Suitable

burrows for nesting are at least 1 m (3.3 feet) above ground or water for predator avoidance, and heights of occupied colony banks in California averaged 3.3 m (10.83 ft) (SD = 1.7, range 1.3 to 7.3, n = 23) (Garrison 2002).

Foraging

Bank swallows are aerial insectivores that forage over lakes, ponds, rivers and streams, meadows, fields, pastures, and bogs (Garrison 1999). Grasslands and croplands immediately adjacent to colonies also provide foraging habitat for bank swallows (CDFG 1992). Adult birds foraging along the Sacramento River typically forage within 50 to 200 meters (164 to 656 feet) of the colony location (Garrison 1998), and the normal maximum foraging distance can be as great as 8 to 10 kilometers (5.0 to 6.2 miles) (Mead 1979).

Species Distribution and Population Trends

Distribution

During the summer months in the western hemisphere, bank swallows range throughout most of Alaska and Canada, southward from eastern Montana to Nevada, and eastward across the United States to Georgia. They are variably distributed throughout California, Texas, and New Mexico. Within California, regular breeding of the Bank Swallow occurs in Siskiyou, Shasta, and Lassen Counties, and along the Sacramento River from Shasta County south to Yolo County (CDFG 2000). Other subspecies are also widespread and common in Europe, Asia, and Africa (Garrison 1999). Bank swallows winter primarily in South America, especially in the southern Amazon Basin and Pantanal (Garrison 1999), although a few winter along the Pacific coast of Mexico (Howell and Webb 1995).

Population Trends

Bank swallows historically nested throughout the lowlands of California (Grinnell and Miller 1944). The species once bred at coastal sites from Santa Barbara County south to San Diego County. They have now disappeared as a breeding bird from southern California (Garrett and Dunn 1981). The historical population along the Sacramento River was most likely larger than it is today, but no population data exist from that era (CDFG 1992).

The colonial nesting habits of the bank swallow and the short-lived nature of colony sites make it difficult to consistently census the species accurately from point counts on Breeding Bird Surveys (Garrison 1999), so trends reported from that data set are not informative. According to CDFG (2000), estimates of breeding pairs in Sacramento River habitats dropped from 13,170 in 1986 to 5,770 in 1997. In 1998, the number of breeding pairs dropped to 4,990 before rebounding in 1999 to 8,210 pairs. Since 2000, numbers have fluctuated between 6,320 and 8,530 pairs (Garcia et al. 2008) Population

size can vary greatly over relatively short time periods because of the poor durability of nesting sites and weather-influenced mortality on wintering grounds (Garrison 1999).

Distribution and Population Trends in the Plan Area

In Yolo County, colonies ranging from 10 to 400 burrows were observed along the Sacramento River and Cache Creek in 1987 (CNDDDB 2005). Breeding occupancy was estimated as ranging 10 to 70 percent at the various colonies. However, many of the colonies were unoccupied or inactive. During a survey in 2000, four colonies totaling 488 burrows were found along the Sacramento River in Yolo County between Verona and Knight's Landing (R. Schlorff and C. Swolgaard unpublished data). Assuming an occupancy rate of 45 percent (as recommended by CDFG), this population was estimated at 202 pairs. An active colony persisted along Cache Creek in a gravel quarry until at least 2001 (Yolo Audubon Society 2004).

Threats to the Species and Other Conservation Issues

In California, the loss of nesting habitat is the most significant threat to Bank Swallows. Nesting habitat is lost through conversion of natural waterways to flood control channels, stabilization of riverbanks for flood control, and other activities that change the natural flow of rivers and prevent the creation of new nesting habitat. Bank stabilization projects are currently the single greatest threat to the state's largest bank swallow population, which breeds along the Sacramento River from Shasta to Yolo Counties (Garrison 1998). These projects have had a significant effect on nesting habitat when banks are sloped to 45 degrees and include large rocks. Colony sites are also destroyed by road building and by increased regulation of water flow from reservoirs that can reduce needed winter bank erosion (to maintain vertical banks) or increase summer flows, which can flood nests and intensify erosion during the breeding season (Humphrey and Garrison 1987, Garrison 1999, Garcia et al. 2008). Destruction of nest sites or burrow collapse due to natural or human-related alteration of banks has been found to be the most significant, direct cause of mortality. Bank Swallow young and eggs are the primary victims of this type of mortality (CDFG 1992). In addition, gopher snakes (*Pituophis melanoleucus*) are a significant predator of eggs and nestlings, and raptors such as peregrine falcons (*Falco peregrinus*) and American kestrels (*F. sparverius*) may take young and adults (CDFG 1992).

Other factors that affect bank swallow populations include fluctuations in the genetic structure of a population; demographic factors such as recruitment rates, sex ratios, and survivorship; climate; and catastrophic events, including flooding, drought, fire, and epidemics (CDFG 1992). Bank swallows are generally tolerant of human disturbance in the general vicinity of colonies (Garrison 1999).

A habitat suitability index model was developed to evaluate habitat for breeding colonies within the continental United States (Garrison 1989). The model assumed that a bank suitable for a nesting colony must be at least 5-m (16.7-ft) long; that suitable foraging habitat occurs within 10 km (6 mi) of the colony; that insect prey are not limited; and that

optimal colony locations are in vertical banks, greater than 1-m (3.3-ft) tall, greater than 25 m (83 ft) long, and consisting of suitable soft soils (sand, loamy sand, sandy loam, loam, and silt loam) in strata greater than 0.25-m (0.8-ft) wide. The habitat variables incorporated into the model included soil texture class and width in strata, slope of bank, height of bank, and length of bank.

A significant data gap exists in regard to locations of recently occupied bank swallow colony sites and population sizes in Yolo County, especially along Cache Creek. More information is also needed to assess the effects of pesticides and other contaminants, predation, and local river dynamics and flood control projects on the swallows and their nesting colonies.

Extinction probabilities of bank swallow colonies along the Sacramento River decreased with proximity to the nearest grassland, decreased with colony size, and increased with maximum water discharge (Moffatt et al. 2005). Creation of vertical banks in friable sandy soils and road cuts can directly benefit the bank swallow if large rocks (rip-rap) are not placed on the slopes. Artificial banks and enhanced natural banks were built along Sacramento River to mitigate loss of colony sites from flood control projects (Garrison 1991). The artificial banks provided some initial success in that bank swallows occupied artificial and enhanced sites for a few years following construction. Nestlings at the artificial and enhanced colonies were produced at levels similar to natural sites. However, these colonies were abandoned after 3 years because maintenance activities such as vegetation removal and bank maintenance were conducted on the sites, thereby rendering them unsuitable as bank swallow habitat (Garrison 1991).

Habitat enhancement is feasible, but to ensure suitable quality of artificial banks, the sites must be maintained. Habitat enhancement is currently considered inappropriate for the long-term maintenance of bank swallows because maintenance, such as excavation with hand tools, is costly to maintain and monitor over time (Garrison 1991, CDFG 1992).

A recovery plan written for the Bank Swallow in California proposed long-term strategies to preserve Bank Swallow habitat including developing set-back levees and a riverine meander-belt, preserving major portions of remaining habitat, and developing reach-by-reach habitat maintenance strategies based on the results of a population analysis of the Sacramento River population outlined in the recovery plan (CDFG 1992).

The population of bank swallows inhabiting the Sacramento River and its major tributaries are the core of the State's population. These areas, therefore, provide the most important habitat for the long-term maintenance and recovery of bank swallows (CDFG 1992). The population analysis in the recovery plan (CDFG 1992) indicated that "the risk of low numbers in some years was substantial for the Sacramento River bank swallow population and, under most modeled conditions, was considerably higher than the risk of near local extinction."

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