Upland Bank Swallow Colony Survey Efforts
2009 Report

11 December 2009

Summary
In addition to the main concentration of colonies on the Sacramento River, Bank Swallows (*Riparia riparia riparia*)(BANS) also nest along other northern California rivers and in some upland cliffs and banks, roadcuts, and sand and gravel quarries. Because these colonies are typically not accessible by boat, they require a different survey method than has been used on the Sacramento River. To complement the work on the Sacramento River, the Bank Swallow Working Group (BSWG) continued efforts to understand the distribution and abundance of Bank Swallow colonies beyond the Sacramento River. This year BSWG: (1) Developed and documented a survey method and data sheet for upland colonies that is consistent with the method used on the Sacramento River, (2) Tested this method by conducting surveys at seven upland colonies, and (3) Developed a state-wide map of Bank Swallow colonies from the Biogeographic Information and Observation System (BIOS), California Natural Diversity Database (CNDDB), and California Wildlife Habitat Relationships (CWHR).

1) Developing an Upland Bank Swallow Survey Method

Based on the Sacramento River Bank Swallow Colony Survey document, Adam Henderson (DWR), Patricia Bratcher (CDFG), Dawn Garcia (CSU Chico), and Nat Seavy (PRBO Conservation Science) developed a draft method for surveying upland Bank Swallow colonies (Appendix 1). This draft will be further refined in 2010.

2) Testing the Upland Bank Swallow Survey Method

To test the upland colony survey methods, we visited 7 BANS colonies in northern California. Raw data from these surveys are included in Appendix 2. Of these sites, BANS activity was observed at four sites, with a total burrow count of 2,640 (Table 1). Using the 45% occupancy correction factor, we estimated that 1,188 pairs nested at these sites. However, relatively low numbers of BANS observed at these sites suggested that the 45% occupancy rate may not be appropriate at these colonies, where unoccupied burrows may persist much longer than they do along actively eroding river channels.

Table 1. Survey results of 7 upland Bank Swallow Colonies visited in spring of 2009.

Colony	BANS activity	Number of Burrows
Fall River Mills	Yes	130
Hat Creek #1 Site 1	Yes (1 pair only)	240
Hat Creek #1 Site 2	Yes	1,480
Hat Creek #2	No	NA
Pit River #1	Unknown	7 (not included in total)
Pit River #2	Unknown	NA
Klamath Basin NWR	Yes	790
	Total burrows:	2640
	Estimated pairs:	1188

Recreational activities (Off highway vehicle use) and quarry activities were observed within the immediate vicinity (< 35 meters) of some of the colonies, suggested there may be a need to develop protection guidelines for upland Bank Swallow colonies.

3) State-wide mapping of Bank Swallow colonies

To generate a better understanding of BANS colony distribution beyond the Sacramento River, Region 1 CDFG used data from BIOS, CNDD, and CWHR to build a state-wide map of Bank Swallow Colonies (Figure 1). It is not yet clear if these data include the data collected by Dawn Garcia in 2008, illustrating the need to develop a single database for upland Bank Swallow colonies.

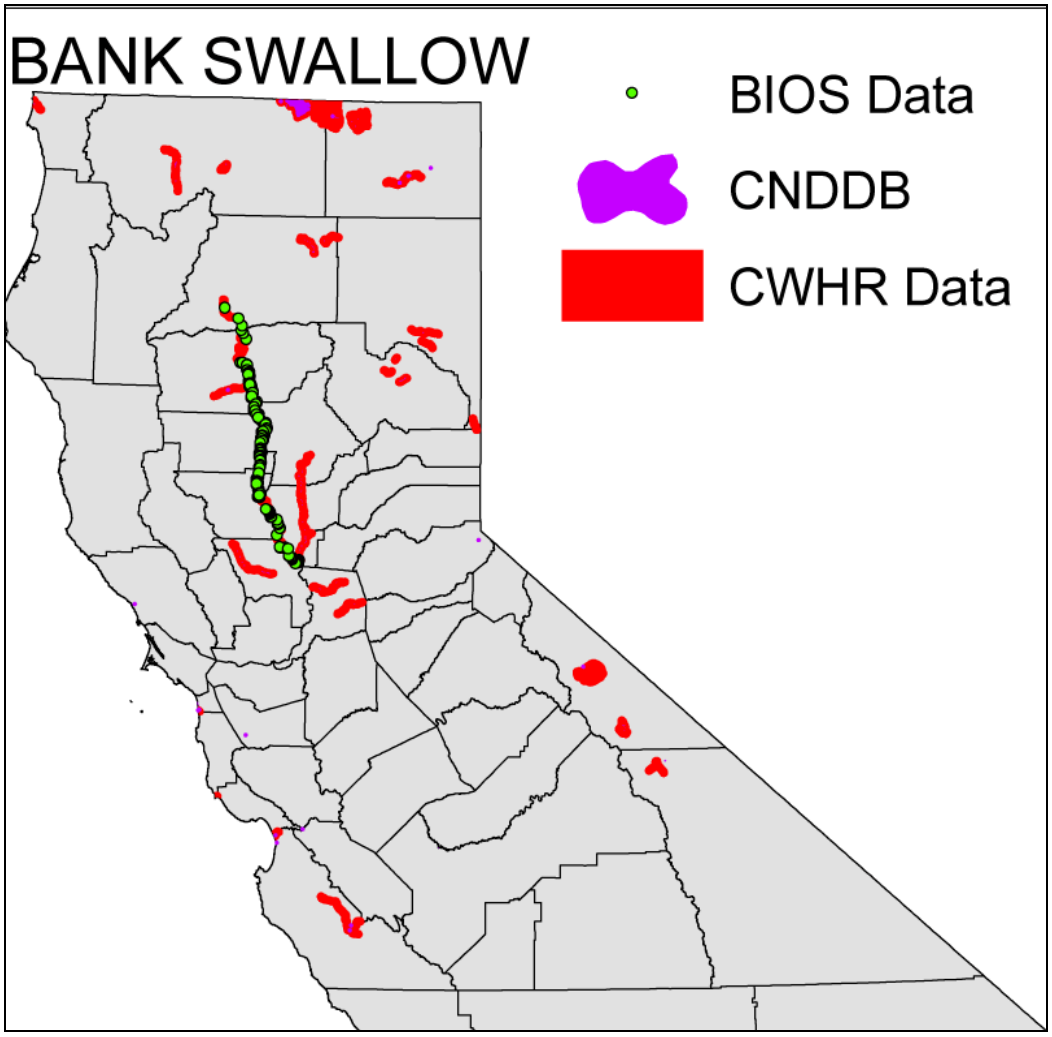

Figure 1. Statewide map of California Bank Swallow colonies and habitat, generate in August, 2009.

APPENDIX 1

Draft Bank Swallow Survey Methods for Upland Sites, Version 1.0

19 August 2009

This document describes Standard Operating Procedures for annual pair counts of Bank Swallow (*Riparia riparia riparia*, or BANS) nesting colonies at upland sites in California. These draft methods have been modified from the boat-based surveys conducted on the Sacramento River. This document is the product of Bank Swallow Working Group.

The methods described in this document are not intended to replace hands on training or experience. The Bank Swallow Working Group highly recommends that new surveyors be trained by experienced surveyors and participate in a bank swallow nesting colony survey with an experienced team.

Planning and Logistics

Burrows are counted and colonies are mapped using California Department of Fish and Game methods, described in this document. Survey should be conducted by two burrow counters. Burrow counters should be trained in the methods described in this document and have the ability to identify colonies, bank swallows, burrows, colony activity, and count burrows. Redundant methods for data collection are highly encouraged.

Required survey equipment includes three tally counters (one for a spare), binoculars, digital camera, notebooks, maps (recent aerial photography with previous surveys mapped on them would be best), two GPS units, and batteries. Recent surveys use a laptop running ArcGIS software, a GPS unit connected to the laptop updating current location in the GIS, and current rectified digital aerial photography loaded into the GIS. Mobile GIS can replace paper maps with previous surveys; however, survey crews should have a redundant system ready in case the GIS system goes down.

The second week in June is the target survey window. This time period is in the heart of the breeding season and is consistent with previous surveys.

Colony Identification

Colonies are typically clusters of burrows in bare or nearly bare, near-vertical banks; usually with more than 30 holes (but can have as few as 10 and more than 3,000), often somewhat horizontally arrayed along favorable strata. Colonies should have a minimum of 10 burrows. Burrows maybe evenly dispersed throughout the length of the colony or maybe more patchy with different densities of burrow numbers within the colony length.

A “typical” BANS burrow entrance is wider than tall, roughly 3 inches wide by 2 inches tall, but there is great variation in this. The birds can get into considerably smaller holes, and sometimes the opening of the burrow is eroded or collapsed so that it becomes larger, rounded, or even taller

than wide. Occasionally Northern Rough-winged Swallows (*Stelgidopteryx serripennis*) may nest in the fringes of BANS colonies in unused burrows. Typically Northern Rough-winged Swallow (NRWS) nest in unoccupied burrows excavated by other bank nesting species including the Bank Swallow and Belted Kingfisher (*Ceryle alcyon).* Therefore their nesting burrows may vary in size but, the NRWS typically nest singly or in small groups (Djong 1996). Also, the NRWS is similar in appearance to the Bank Swallow, but is slightly larger and lacks the distinctive brown breast band of the BANS.

Activity

Presence of bank swallows, such as a large number of birds around the burrows with birds flying in and out of burrows and young observed at burrow entrances is helpful but not necessary to identify an active colony. A colony of bank swallows may finish nesting before the survey, or may not emerge from their burrows, or may avoid the area while the survey is taking place (in this case, it is important to watch the colony while approaching and leaving the site to see if birds leave or return to burrows). Larger colonies tend to have a longer active period over the season, due to late arrivals extending the occupation period.

Active colonies are determined by the presence of bank swallows and/or fresh burrows. Active colonies do not necessarily have birds present; however, active burrows will have fresh scrape marks, white wash or urates at the burrow entrance, clean and well maintained burrows, and usually have classic oval burrow entrances. Active burrows are inky black, because they are deeply dug and in general they have a smooth, "clean" look. Active burrows may have claw marks associated with them, either faint tiny swallow marks at the burrow entrance, or deeper marks of predators trying to access young or dig out the burrows for young or eggs. Clapping hands loudly near the colony may elicit bank swallows to exit their burrows, confirming presence and activity.

Inactive colonies consist of burrows that are often collapsed, lack the fresh faint scrape marks and urates at the burrow entrance, have spider webs in the burrows, and appear overall unkept. Inactive burrows may appear grayish because they are shallow, incompletely dug or collapsed. Spider webs may crisscross inactive burrows and should not to be confused with root fringes at edges of some active burrows. Inactive burrows look rough or craggy and often show signs of collapse.

Counting

Two people (the counters) use a standard handheld tally counter to count each active burrow within the active colony. Large colonies may require the counter to tally groups of 5 or 10 burrows per tally click and multiply the resulting tally accordingly. Pointing to burrows with an extended hand or finger may aid counter in keeping their place. Once the count is completed, the counters compare tallies and keep only the tallies that are within 10% of each other. Tallies that are significantly off (over 10%) are not documented, and the tally counters are zeroed and colony is recounted. Once a satisfactory tally is made, both tallies are entered into the database or field notes by the mapping specialist.

Mapping

Each colony should be mapped from beginning to end by the mapping specialist. The colony should be mapped by heads up digitizing the bank from recent aerial photos on a laptop computer running ArcGIS (or equivalent software), using the GPS to locate the position of the mapper. The lead counter determines the beginning and end of each colony, instructing the mapping specialist where to start and end each colony line in the GIS. If the survey team does not have access to mobile GIS equipment, the mapping specialist can map the colony as a line following the bank on recent aerial photography. GPS points should be taken at both ends of each colony as close to the bank as possible. GPS end points can be incorporated into the GIS once back in the office to accurately determine the locations on the colony. In the office, each colony should be heads up digitized into the GIS along the bank using recent rectified aerial photography.

Data Collection

In addition to colony location and burrow counts, other field data to be recorded in the GIS database or field sheets during the survey include:

- Name of observer
- Observation Date and Time
- Approximate location- this is a short narrative describing the location of the colony.
- UTM coordinates: Datum, easting, northing.
- Activity- Yes or no based on description of activity described in this document.
- BANS Presence- If active, whether bank swallows were present or absent at the colony.
- Number of burrows
- Length of bank: Approximation, to the half meter, of the extent of the bank face on which the colony is located.
- Elevation Above ground- Approximation, to the half meter, of how high above the based of the bank the first band of burrows in the colony are on the bank.
- Elevation Above Slope Break- Approximation, to the half meter, of how high above the slope break the first band of burrows in the colony are on the bank. On vertical banks, this maybe the same as the elevation above ground.
- Total Bank Height- Approximation, to 2 meters, of how high the top of bank is above the ground.
- Ownership, Agency, and Unit- If the ownership is known, record whether it is private or public, who the landowner or managing agency is, and if it is a public agency, the name of the management unit. These data can be improved in the office.
- Photos/Photo Numbers- Digital photos are an important dataset. Multiple photographs should be taken of each colony. The photo numbers should be recorded for each colony in the database and linked in the GIS.
- Vegetation adjacent to bank- Dominant vegetation type immediately adjacent to the bank. Riparian forest, riparian scrub, grassland, orchard (tree or herb).
- Vegetation over bank- Dominant vegetation type behind or near the bank. Riparian forest, riparian scrub, grassland, orchard (tree or herb).
- Notes- Any data not recorded in the other data fields should be recorded in a *notes* field. Any observations not captured in the core data should be documented here. Information on early (or later) observations of nesting activity can be recorded here. Also, information on soil types, e.g., sand, diatomaceous earth, etc would also be useful.

Ideally, each survey will have two final products. First, in order to store the data, a GIS geodatabase or shapefile should be created with complete metadata. The shapefile will be a series of lines that represent each colony mapped and should include links to the photos taken of each colony. All the data described above is easily incorporated in the GIS database, which is spatially linked to each colony as part of the GIS shapefile or geodatabase. Primary analysis includes averaging the burrow counts and multiplying by .45 (45%) to adjust to the occupancy rate (Humphrey and Garrison 1986). The second product should be a summary report that puts the current survey in the context of population trends. The summary report is typically completed and distributed by appropriate DFG staff.

References

Dejong, M.J. 1996. Northern Rough-winged Swallow (*Stelgidopteryx serripennis*). *In* The Birds of North America, No. 234 (A. Poole and F. Gill, eds.) The Academy of Natural Sciences, Philadelphia, PA and the America Ornithologists Union, Washington, D. C.

Humphrey, J. and B. Garrison. 1986. The Status of Bank Swallow Populations on the Sacramento River, 1986. Calif. Dep. of Fish and Game, Wildlife Management Div., 35 pp. + appends).

Draft Bank Swallow Survey Data Sheet for Upland Sites

19 August 2009

Upland Bank Swallow Colony Survey

Name of observers:			
Date	Month:	Day:	Year:
Time:			
Location:			
UTM Coordinates:			
Datum:			
Easting:			
Northing:			
Colony information:			
Active colony: Yes No Bank Swallows present: Yes No			
Number of burrows: Count #1: Count#2:			
Length of bank (0.5 m)			
Elevation above ground (0.5 m):			
Elevation above slope break (0.5 m):			
Total bank height (circle one):0 - 2 m, 2 - 4 m, 4 - 6 m, 6 - 8 m, 8 - 10 m, over 10 m			
Ownership:			
Photos/photo numbers:			
Vegetation adjacent to bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, Disturbed, Orchard, Other (specify)			
Vegetation over bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, Disturbed, Orchard, Other (specify)			
Notes:			

APPENDIX 2

Upland Bank Swallow Survey Results from Surveys Conducted in Spring, 2009

Upland Bank Swallow Colony Survey

Name of observers: Bratcher			
Date	Month: June	Day: 18	Year: 2009
Time: 1230			
Location: Fall River Mills (in town) on north side of Hwy 299, CDFG land			

UTM Coordinates:

Datum: nad 83
Easting: 631220.9
Northing: 4540366.2

Colony information:

Active colony: Yes Bank Swallows present: Yes
Number of burrows: Count #1: 131 Count#2:
Length of bank (0.5 m) 72.5
Elevation above ground (0.5 m): 3.5
Elevation above slope break (0.5 m): 1.5
Total bank height (circle one): 6 - 8 m
Ownership: CA Dept. of Fish and Game
Photos/photo numbers: Yes; attached
Vegetation adjacent to bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, Disturbed, Orchard, Other (specify) Grass/juniper
Vegetation over bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, Disturbed, Orchard, Other (specify) Grass, juniper, bare ground
Notes: Observed approx. 25 BANS in area; several of holes had multiple (2-3) babies in them. Problem with bank sloughing and access to bank by ground squirrels.

Upland Bank Swallow Colony Survey

Name of observers: Bratcher			
Date	Month: June	Day: 18	Year: 2009
Time: 1330			
Location: Hat Creek 1-1; West side of Hat Creek, north of Hwy 299, along unnamed dirt road			

UTM Coordinates:

Datum: NAD 83
Easting: 620688.5
Northing: 4537124.4

Colony information:

Active colony: No? Bank Swallows present: Yes A20
Number of burrows: Count #1: 237 Count#2: N/A
Length of bank (0.5 m) 131.5
Elevation above ground (0.5 m): 11
Elevation above slope break (0.5 m): 1
Total bank height (circle one): over 10 m
Ownership: Private--PG&E ?
Photos/photo numbers: Yes; attached
Vegetation adjacent to bank: Grass/Ponderosa Pine
Vegetation over bank: Shrub/Ponderosa Pine
Notes: Waited 10 minutes before observing BANS; saw only 1 pair (2 birds) after watching site for over 25 minutes. Many of the holes looked clean (no cobwebs).

Upland Bank Swallow Colony Survey

Name of observers: Bratcher			
Date	Month: June	Day: 18	Year: 2009
Time: 1400			
Location: Hat Creek 1-2-North; West side of Hat Creek, north of Hwy 299, along unnamed dirt road			

UTM Coordinates:

Datum: NAD 83
Easting: 619918.2
Northing: 4537483.8

Colony information:

Active colony: Yes Bank Swallows present: Yes
Number of burrows: Count #1: 390 Count#2: N/A
Length of bank (0.5 m) 175
Elevation above ground (0.5 m): 11
Elevation above slope break (0.5 m): 1.5
Total bank height (circle one): over 10 m
Ownership: Private--PG&E?
Photos/photo numbers: Yes; see attached
Vegetation adjacent to bank: barren/shrub
Vegetation over bank: Shrub/Ponderosa pine; recently burned (within last 2 years); lots of bare ground.
Notes: Very close to another cliff face but not connected, so labelled as 1-2-north. Saw approx. 40 birds

Upland Bank Swallow Colony Survey

Name of observers: Bratcher			
Date	Month: June	Day: 18	Year: 2009
Time: 1415			
Location: Hat Creek 1-2-South; west side of Hat Creek; north of Hwy 299; unnamed road			

UTM Coordinates:

Datum: NAD83
Easting: 620077.2
Northing: 4537541.9

Colony information:

Active colony: Yes Bank Swallows present: Yes
Number of burrows: Count #1: 990 Count#2: N/A
Length of bank (0.5 m) 122
Elevation above ground (0.5 m): 12
Elevation above slope break (0.5 m): 0.5
Total bank height (circle one): over 10 m
Ownership:
Photos/photo numbers:
Vegetation adjacent to bank: barren/shrub
Vegetation over bank: Shrub/Ponderosa pine; recently burned (within last 2 years); lots of bare ground.
Notes: Very close to another cliff face but not physically connected, so labelled as 1-2-south. Saw approx. 50 birds. Cut bank below colony where sand had been harvested, thereby creating a shelf/road. Below this, at the actual bottom of the cliff face, heavy equipment was actively mining sand while I was there (truck and backhoe). Many of the hoes appeared clean (no cobwebs).

Upland Bank Swallow Colony Survey

Name of observers: Bratcher			
Date	Month: June	Day: 18	Year: 2009
Time: 1600			
Location: Pit River-1; Confluence of Pit River and Lake Briton; on lake near right bank.			

UTM Coordinates:

Datum: NAD 83
Easting: 619790.3
Northing: 453869.0

Colony information:

Active colony: Yes ? Bank Swallows present: Unk
Number of burrows: Count #1: 7 Count#2: N/A
Length of bank (0.5 m): 8
Elevation above ground (0.5 m): 2.5
Elevation above slope break (0.5 m): 0.5
Total bank height (circle one): 4 m
Ownership: Unkown; may be State Park (Burney Falls)
Photos/photo numbers: Yes; attached
Vegetation adjacent to bank: Grassland-Herbaceous
Vegetation over bank: Grassland-Herbaceous
Notes: Had to look south across lake/river confluence to look at colony. Access from lake would be useful.

Upland Bank Swallow Colony Survey

Name of observer: **ALICIA YOUNG**			
Date	Month: **JUNE**	Day: **12**	Year: **2009**
Time: **11:26**			
Location: **DOWNTOWN FALL RIVER MILLS, CA. AS YOU ENTER TOWN ON 299 FROM THE WEST, THE COLONY IS ON THE LEFT, JUST PAST THE MAYFLY PUB.**			

UTM Coordinates:

Datum: **NAD83**
Easting: **631204**
Northing: **4540350**

Colony information:

Active colongy: Yes **No** Bank Swallows present: **Yes** No
Number of burrows: Count #1: **324** Count #2: **306**
Length of bank (0.5 m): **50**
Elevation above ground (0.5 m): **3**
Elevation above slope break (0.5 m): **1.5**
Total bank height (circle one):0 - 2 m, 2 - 4 m, **4 - 6 m**, 6 - 8 m, 8 - 10 m, over 10 m
Ownership: **DFG (?)**
Photos/photo numbers: **Shasta_BANS1, Shasta_BANS2, Shasta_BANS3, Shasta_BANS4, Shasta_BANS5**
Vegetation adjacent to bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, Disturbed, Orchard, **Other** (specify) = **BUILDINGS**
Vegetation over bank: Riparian Tree >6 meters, **Riparian Shrub-Scrub <6 meters**, Grassland-Herbaceous, Agriculture, Disturbed, Orchard, Other (specify)
Notes: **COLONY WAS ACTIVE IN 2008 AND 2007.**

Upland Bank Swallow Colony Survey

Name of observer: **ALICIA YOUNG**			
Date	Month: **JUNE**	Day: **10**	Year: **2009**
Time: **11:19**			
Location: **FROM STATE LINE RD 161, TURN SOUTH ON DORRIS BROWNELL ROAD. TURN RIGHT ONTO GRAVEL ACCESS ROAD AND FOLLOW SOUTH AND WEST TO COLONY.**			

UTM Coordinates:

Datum: **NAD83**
Easting: **614143**
Northing: **4645186**

Colony information:

Active colongy: **Yes** No Bank Swallows present: **Yes** No
Number of burrows: Count #1: **812** Count #2: **763**
Length of bank (0.5 m): **15**
Elevation above ground (0.5 m): **4**
Elevation above slope break (0.5 m): **1**
Total bank height (circle one):0 - 2 m, 2 - 4 m, 4 - 6 m, **6 - 8 m**, 8 - 10 m, over 10 m
Ownership: **USFWS, KLAMATH BASIN NWR**
Photos/photo numbers: **Siskiyou_BANS1, Siskiyou_BANS2, Siskiyou_BANS3, Siskiyou_BANS5**
Vegetation adjacent to bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, **Disturbed**, Orchard, Other (specify)
Vegetation over bank: Riparian Tree >6 meters, Riparian Shrub-Scrub <6 meters, Grassland-Herbaceous, Agriculture, **Disturbed**, Orchard, Other (specify)
Notes: **GRAVEL MINING OCCURRED DURING SURVEY WITHIN ~35M OF COLONY.**