

Survey Protocol for Determining Presence of the Buena Vista Lake Ornate Shrew

The following protocol for determining the presence of the Buena Vista Lake ornate shrew (*Sorex ornatus relictus*), known hereafter as the shrew, was approved by the U.S. Fish and Wildlife Service (Service) on December 10, 2012. This protocol will be conducted only by those individuals holding valid take permits issued by the Service and the California Department of Fish and Wildlife. This protocol is to be used in concert with the terms and conditions of those permits.

1. At each location to be surveyed, traps will be set for a minimum of 5 nights unless shrews are captured prior to the fifth night. For presence-only surveys, all traps will be removed immediately following the capture of an individual shrew.
2. A team of a minimum of two biologists will survey for the shrew at the specified locations. For larger trapping efforts additional teams of two biologists may be needed to safely and reliably conduct the surveys within the time constraints listed in the terms and conditions below. The Service will approve all trapping plans in advance, including the number of trapping teams to be used.
3. Traps will be spaced 5 m (16 ft) apart per linear transect unless terrain or circumstances dictate another arrangement. Alternate transect designs, which should be reviewed by the Service in advance of the survey if possible, will be documented and reported in the final report.
4. Two types of traps may be used during surveys:
 - Small, folding Sherman live traps (Model SFA, 16x6.5x5 cm), or a similar manufacturer's design approved by the Service, or
 - Plastic pitfalls, up to 1.9 liter (½-gallon), maximum, in capacity.

The preferred trapping method is the use of the Sherman live traps. Plastic pitfall traps may be used on a case-by-case basis depending on the nature of the trapping. However, written authorization from the Service to use pitfall traps is required before setting up and using a pitfall trap array.

5. Trapping surveys will be conducted between Feb 1st and May 31st.
6. Sherman traps will be set approximately 1 hour before sunset and will be checked early the following morning with the completion of checks occurring no later than 1 hour after sunrise. Pitfall traps will be checked on a routine basis to prevent drowning, predation, or injury to the trapped shrews or other non-target species. The schedule for checking pitfall traps will be reviewed by and authorized in advance by the Service.
7. Traps will be baited with 10-15 mealworms and/or waxworms. Cotton/polyester batting (short fiber foam type preferred) will be placed inside of the traps for bedding and insulation for captured shrews. Traps will be rebaited during trap checks, as necessary, to keep the amount of bait in the trap equal to at least 10-15 worms. Care will be taken to

insure an appropriate amount of bedding and food for the interval between trap setting and checking is provided to prevent low ambient temperatures [50°F (10°C) to 70 °F (21 °C)] from adversely affecting the captured shrews.

8. During the threat of inclement weather, such as the National Weather Service prediction of a 20 percent or greater chance of rain, all pitfall traps will be closed and all Sherman-type traps will be covered with a protective covering (waxed paper milk cartons are preferred) to keep the trap, bedding, and any occupants dry. In addition to providing protection from rain or heavy dew, milk cartons also provide a degree of insulation. Milk cartons should also be used to provide shade if occupied traps are expected to be exposed to direct sunlight and shading vegetation is not present; however all traps should be checked before air temperatures (taken in the shade) exceed 80 °F (27°C) to 85 °F (29°C). Should the air temperature drop below 50°F (10°C) or exceed 105 °F (41 °C), all traps will be closed. Traps should be placed 20 feet or greater away from of any active ant mounds. If it is evident that ants are actively foraging in an area than traps will not be set in or around that area.
9. Animals removed from traps will be handled only in small cloth or mesh bags. Plastic bags are not acceptable due to the threat of asphyxiation. Data collected for each shrew captured will include, but is not limited to size and weight. If the survey includes a mark-recapture study then the fur on the rump of the shrew will be marked with a non-toxic, felt-tipped marker to identify any recaptured animals.
10. To identify shrews to subspecies, genetic samples of tissue (tip of tail), blood, and/or fecal material will be collected from each shrew captured. Tissue samples will not exceed 3mm in length. Tissue samples will be stored in 95% ethanol (reagent grade). Blood will be collected from the tip of the amputated tail using hematocrit tubes that will be placed in small vials. Antibiotic ointment will be placed on the tip of the remaining tail. Blood vials will be labeled and placed in an ice chest with ice and should be transported to a freezer or placed on dry ice as soon as practical. All biological samples will be retained at a facility approved by the Sacramento Fish & Wildlife Office (SFWO). Samples will be sent to the Smithsonian Institution, or a similar facility, for genetic analyses. When directed by the accepting facility payment will accompany the shipment of samples. Any alternative disposition of samples must be arranged with SFWO prior to trapping.
11. All shrews captured will be processed at the site of capture. Captured shrews will be released at the site of capture as soon as possible after being processed and data recorded. During handling, if a shrew exhibits signs of physiological stress (*e.g.*, excessive respiratory rate or effort) it will be released immediately. If it is evident that the release at the site of capture would cause the shrew to be injured or killed, then the shrew will be moved as close to the point of capture as possible where the animal may be safely released.
12. The permit coordinator at the SFWO will be notified within 3 days in writing, of a capture or identification of a shrew. During surveys, the following data will be recorded and included in a written report:

- date and time (setting traps; beginning and end of trap checks) of survey;
 - effort (number of traps, trap-hours, and trap-nights; etc.);
 - type of trap and bait;
 - weather conditions at start and end of survey;
 - moon phase;
 - site description including GPS/GIS information and photographs of habitats and microhabitats; classification of habitat and microhabitat types (including approximate acreages of each); size and location of areas sampled; soil classifications; topography and elevation; proximity to water; and surrounding land-use activities;
 - appropriate scale maps showing all locations of captured shrews with associated GPS information;
 - data on weight and size and other pertinent morphological data, of the shrew;
 - if evident, without harming the animal, the sex and reproductive status of the animal will be recorded (*e.g.* mammary development or testes enlargement);
 - type(s) of samples collected for genetic analyses; and
 - names and qualifications of surveyors.
13. Any shrew incidentally killed during surveys or research will be placed in a freezer as soon as practical. Shrew carcasses shall ultimately be placed in the collection of a professionally maintained scientific facility or museum with the appropriate permits. A list of preferred facilities is included as a term and condition in the section 10(a)1(A) permit. The permittee will check with the accepting facility for instructions on preparation of the carcass for shipment or transport. SFWO will be notified by telephone within 1 working day of a shrew mortality, and in writing within 2 weeks of the incident. A final report summarizing trapping efforts and all data collected will be submitted to the SFWO within 30 days of completion of surveys to the Chief of the Endangered Species Division.

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