

Jemez Mountains Salamander Survey Techniques

7 March 2022 Version

These survey techniques are based on techniques developed jointly between the New Mexico Department of Game and Fish (NMDGF) and U.S. Fish and Wildlife Service (USFWS).

The following techniques are for Visual Encounter Surveys (VES) that consist of 3-person hour surveys or until first detection, and are to be used with the associated data form, dated: 25 July 2017. When possible, repeat surveys should be conducted at the same site within the same year so that data can be used in an occupancy model. Repeat surveys should be conducted at least twice within a single season.

These techniques and training can only prepare you to conduct detection surveys; they do not permit you to conduct surveys in New Mexico including public and private lands. For those intending to conduct Jemez Mountains salamander surveys, **federal and state permits are required**. In addition to federal and state issued permits, additional permits may be required by other agencies such as the U.S. Department of Agriculture Forest Service, the Valles Caldera National Preserve, and/or by the National Park Service.

Both the Data collection form and these survey techniques are working drafts and are subject to change. Please contact Clinton Smith at USFWS at clinton_smith@fws.gov or Leland Pierce at NMDGF at leland.pierce@state.nm.us for the most current version subsequent to this 7 March 2022 version. Feedback on improving techniques, the form, or instructions are encouraged and can be sent to the above contacts. Additionally, please check regularly for updated protocols, techniques, and forms posted to the USFWS [New Mexico Ecological Services Field Office webpage](#).

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1. Prior to departure to site, be sure field equipment and footwear are clean and disinfected following disinfection protocols. Disinfection protocols are presented at the one-day salamander classroom training. Written disinfection protocols will be posted soon at: New Mexico Ecological Services Field Office webpage.
2. Upon arrival to site to be surveyed begin filling out data sheet up to “Moisture Assessment”.
3. Assess moisture conditions and enter on data sheet:
 - a) Visually assess whether the area has had recent rain and overall appears moist or wet looking. This is not a criterion but will help determine if conditions are suitable for salamander surface activity. Weather information regarding precipitation from online or observed can be entered on the form (e.g. data from Los Posos RAWS weather station indicates rain from July XX-XX, 2015).

- a) Collect and enter on data form current weather, soil moisture, and soil temperature data. If you do not have instrumentation for soil moisture, or temperature enter written description or N/A.
 - b) Check moisture under 10 cover objects (rocks, logs, bark slabs); soil under cover objects should be “moist to the touch”. If soil is not “moist to the touch” and is “dry to the touch” do not survey. If soil under cover objects is “moist to the touch” then proceed to step 4.
 - c) If decomposing coniferous logs are present, you may open a small portion of a log with your hands and squeeze; significant water should come out. If water does not come out, conditions are likely too dry and you should not survey. If water comes out, proceed to step 4.
 - d) If you find a salamander while checking moisture conditions, you are lucky, and you should capture the salamander and notify your co-workers (see step 4.d below). It is recommended to yell “SALAMANDER!!” to avoid confusion. Collect remaining data, fill out the data form, and you are finished.
4. Start Surveying for 3-Person Hour Survey.
- a) One individual is the center point and lead for the survey; the remaining surveyors are spaced approximately 30 ft apart in a line.
 - b) The lead surveyor is responsible for tracking time and recording data on the data form.
 - c) The lead surveyor will initiate the survey, will indicate the half-way point to pause and collect GPS coordinate data, resume the survey, and end the survey.
 - d) Survey specifics are listed under 6.
 - e) When a salamander is found, the person who finds it captures it, places it in a plastic ziplock baggie with a very small amount of water (remember they breathe through their skin so too much water will drown them and no water will severely stress them potentially causing death, as will being in close contact with a sealed plastic bag without air). A small spray bottle with distilled water can be useful for moistening the salamander. Either at the moment of observation or after capture that person notifies the remaining survey crew. Yelling “SALAMANDER!!” is an effective way to communicate to the entire crew that one has been found and everyone should immediately stop surveying. With baggie zipped, either hold the baggie with salamander (shade it with your body) or carefully place salamander in shaded area and either record microhabitat or replace the cover object while retrieving thermometer to then record microhabitat temperature. It is most important to keep the salamander cool, moist, shaded, and safe.
 - f) The lead surveyor records the time, collects their current GPS coordinate, then joins the surveyor with the salamander.
 - g) Other surveyors collect their GPS coordinates and joins the surveyor with the salamander. Proceed to step 6 and finish filling in the data form.

5. If no Salamanders are observed:
 - a) Stop searching after 3-person hours of searching.
 - b) Fill out data form, record NO SALAMANDERS OBSERVED clearly on the data form.
6. Survey Specifics:
 - a) Carefully look under potential cover objects such as rocks, logs, bark, moss mats, and leaf litter. **VERY IMPORTANT NOTE: REPLACE COVER OBJECTS AS YOU FOUND THEM AS BEST YOU CAN.** Once a cover object has been lifted, the seal with the ground surface has been broken, and the microhabitat under the cover object has been compromised, making it more likely to dry out and warm up. By placing it back as best as you found it, it will limit those effects.
 - b) Historically and in previous trainings, the protocol included carefully looking inside of logs for salamanders. **This approach is no longer used.** Looking inside logs should not be done, unless there is a very specific research question that is being addressed and this is coordinated and communicated with NMDGF and USFWS.
7. Collect Bd sample. Label vial with date, location, species (PLNE), and a number. To swab, take a sterile cotton swab and rubbing it on the ventral (bottom) side of the salamander approximately 30 times and the bottom of the feet approximately 10 times. Be sure to get around the cloaca (vent) well. Break the handle off by partially inserting the swab end into the vial containing 70% ethanol and breaking the stick off using the side of the vial. If you insert the swab all the way to the bottom before breaking, the cap will not close all the way. Record data on form. Samples should be sent to a reputable laboratory for testing. Please contact clinton_smith@fws.gov or leland.pierce@state.nm.us for list of laboratories.
8. Measure the salamander and inspect tail condition and record data on form.
9. Release the salamander by first replacing the cover object back as best as you found it, then place the salamander next to an opening next to the cover object so it can crawl back under on its own. NEVER place a cover object on top of a salamander. Sometimes you might need to gently encourage the salamander to crawl in the right direction for cover or use your small spray bottle with distilled water to moisten the release site microhabitat.
10. Complete data form.
11. If going to a different site (not in immediate vicinity; either traveling by car or into a different drainage by foot) then clean and disinfect equipment and footwear at vehicle.
12. Wash and scrub hands with soap and water before leaving site or handling another salamander.